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CONTRACT NO. DAAK10-78-C-0165  
GULF + WESTERN PROJECT NO. 30012

7.62 MM CARTRIDGE CASE FEASIBILITY STUDY

PREPARED BY R. L. Weber  
F. W. Dietsch  
DATE January 12, 1981  
CHECKED BY R. J. STORKE  
APPROVED BY K. Hail 1.12.81

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1. SUMMARY . . . . .	1
2. INTRODUCTION . . . . .	2
3. OBJECTIVE . . . . .	3
4. PLAN . . . . .	4
5. PROPOSED PROCESS . . . . .	6
6. TOOLING DEVELOPMENT . . . . .	8
6.1 Equipment . . . . .	8
6.2 Effect of Tool Modifications . . . . .	8
6.3 Final Tool Designs . . . . .	12
7. ANNEALING DEVELOPMENT . . . . .	13
7.1 Equipment . . . . .	13
7.2 Coil Design . . . . .	19
7.3 Final Configuration . . . . .	20
7.4 Void Tests . . . . .	22
8. IN-PROCESS PART DEFINITIONS . . . . .	26
9. FINISHED PART INSPECTION . . . . .	27
9.1 Dimensional . . . . .	27
9.2 Metallurgical . . . . .	27
10. TEST FIRING . . . . .	28
11. SCAMP EQUIPMENT CHANGES . . . . .	29
11.1 Tooling . . . . .	29
11.2 Basic Equipment . . . . .	29
11.3 Layout . . . . .	31
12. CONCLUSIONS . . . . .	34

ILLUSTRATIONS

<u>FIGURE NO.</u>	<u>PAGE</u>
1. DEVELOPMENT HISTORY . . . . .	5
2. PROPOSED PROCESS . . . . .	7
3. TAPER TOOL MODULE . . . . .	9
4. TAPER SIMULATOR AND TOOL MODULE . . . . .	10



TABLE OF CONTENTS  
(Continued)

<u>FIGURE NO.</u>	<u>PAGE</u>
5. INDUCTION TEST RIG SCHEMATIC . . . . .	14
6. INDUCTION TEST RIG . . . . .	15
7. QUENCH AND BLOW OFF CHAMBER . . . . .	16
8. BODY ANNEAL INDUCTION COIL . . . . .	25
9. DRAW PUNCH SLEEVE . . . . .	30
10. EQUIPMENT LAYOUT SCHEMATIC . . . . .	32

ATTACHMENTS

<u>ATTACHMENT NO.</u>
1. TOOL DRAWINGS
2. COIL DRAWINGS
3. IN-PROCESS PART DEFINITIONS
4. DIMENSIONAL INSPECTION DATA
5. METALLURGICAL INSPECTION DATA
6. TEST FIRING DATA
7. VOID TEST DATA



1. SUMMARY

This document reports the activities and results of a program carried out by the Advanced Development and Engineering Center of GULF + WESTERN to develop a process to manufacture 7.62 mm cartridge cases on SCAMP equipment. The program was funded by ARRADCOM under Contract Number DAAK10-78-C-0165, which followed G+W Proposal Number 15506A.

The program plan was based on a tentative process mutually arrived at by ARRADCOM and G+W in which the critical tasks were: (a) developing a three-draw process from the specified standard U.S. cup using one inter-draw anneal; and, (b) developing an induction anneal system to satisfy the U.S. - N.A.T.O. grain specifications.

All development work was carried out at the G+W Folcroft facility using G+W press simulators and a specially designed induction anneal test rig. Although this equipment is manually operated, the various operations of the SCAMP equipment are closely simulated in terms of metalforming and heating functions.

The program was successful in accomplishing its objectives and culminated in the supply of a small quantity of cartridge cases to ARRADCOM for evaluation and test firing.



## 2. INTRODUCTION

Over the last decade, G+W has been responsible for the conception and development of high speed rotary ammunition systems as part of an extensive modernization program carried out under the auspices of the P.B.M. office of ARRADCOM.

The systems are now installed at L.C.A.A.P. and are producing 5.56 mm caliber ammunition. The systems were designed to be compatible with conversion to produce other caliber sizes. However, it was also recognized that some addition to, or modification of, the basic equipment may be necessary to accommodate differences in processes appropriate to other calibers.

G+W has supplied systems to overseas customers which produce 7.62 mm as well as 5.56 mm ammunition and, in doing so, has developed suitable processes. However, the U.S. - N.A.T.O. requirements define a specific grain structure and ARRADCOM also stipulated that the standard U.S. cup must be used. These factors introduced complications of process beyond those already developed.

G+W Proposal Number 15506 resulted in ARRADCOM placing a contract to develop a process which would fulfill the requirements and be compatible with SCAMP equipment.





3. OBJECTIVE

The objective of the program was to establish a process to produce 7.62 mm, M80 cartridge cases on a SCAMP sub-module at 1200 parts per minute.

Program completion would be recognized with submission of: (a) 1,000 acceptable 7.62 mm cases to Drawing Number 10521997 with applicable grain specification and, (b) a final technical report.

A contract modification added a test to evaluate the effect of voids (missing parts) in the transport chain on the performance of the anneal system.



#### 4. PROGRAM PLAN

The plan which was prepared and generally followed is outlined below:

1. Identify differences between the proposed 7.62 mm process and the current 5.56 mm SCAMP process, then develop the proposed process and define the methods of showing compliance with the product specification.
2. Design and procure the necessary developmental tooling and equipment, including an induction anneal system.
3. Set up simulators, tool modules, induction anneal system and processing equipment.
4. Develop tooling and induction anneal process to obtain required dimensional and metallurgical properties.
5. Perform measurements of in-process dimensions, head hardness, hardness gradient and grain structure to define in-process part characteristics.
6. Produce a small batch of finished parts for Government evaluation and process approval.
7. Produce 1,000 parts to be test-fired by the Government.
8. Develop final recommended process flow diagrams and in-process part specifications.
9. Prepare a final technical report.
10. Deliver items as follows:
  - (i) Progress reports
  - (ii) Final technical report
  - (iii) 1,000 finished cases
  - (iv) Tools and test equipment procured under the contract

The only significant deviation occurred in relation to Item 6, above, in that three series of samples were produced and evaluated before approval to proceed was granted.

Test series A produced parts with dimensional discrepancies. Test series B resulted in minor dimensional discrepancies and ARRADCOM requested a further series C which would use L.C.A.A.P. process specifications where appropriate, as well as correcting the deviations.

The actual timetable of activities is summarized in Figure 1.

## MONTHS AFTER CONTRACT AWARD

	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32
Contract Award, May 1978	△																
Design/Procure Tools			△														
Design/Procure Anneal Coils			△														
Procure Induction Equipment			△														
Set up Equipment			△														
G.F.M. Supplies			△														
Development Series/Samples				△	△	△	△	△									
ARRADCOM Evaluation/Approval						△	△	△	△								
1000 Parts																	
Final Report																	
Contract Completion, December 1980																	

Figure 1 PROGRAM HISTORY



## 5. PROPOSED PROCESS

Referring to Figure 2, the ARRADCOM stipulation was that the process should use the standard U.S. cup, Drawing Number 10522459. It was considered that the geometry of this cup, with consequent high area reduction through the final draw, mandated a three-draw process.

The second consideration was that, in order to attain the specified grain structure, an anneal would have to be performed between second draw and final draw.

The third consideration was the addition of a pre-pocket operation prior to heading so as to have a reliable primer pocket condition and adequate internal head hardness.

The remainder of the process is similar to the 5.56 mm SCAMP process.

By comparison, the conventional 7.62 mm process has an additional anneal between first draw and second draw, a machine trim instead of pinch trim and additional wash, lube and dry operations.

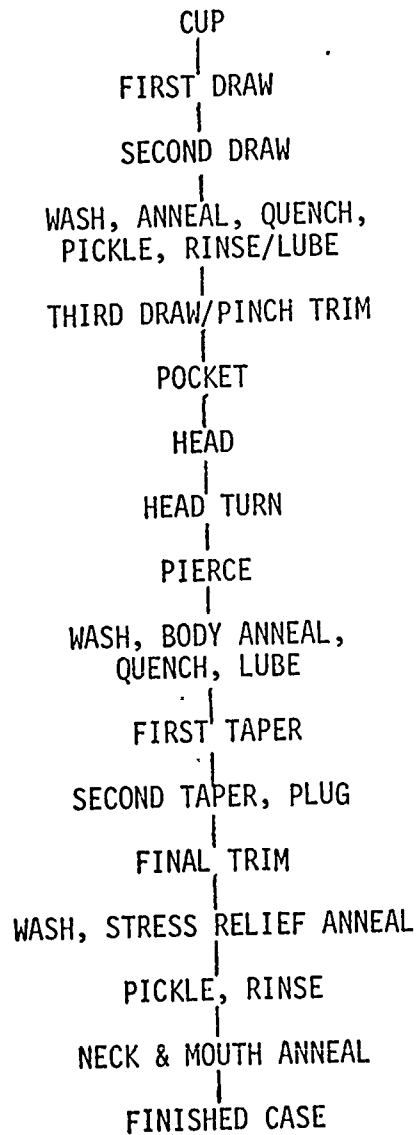


FIGURE 2 PROPOSED PROCESS

## 6. TOOLING DEVELOPMENT

Following the process selection described in Section 5, tentative in-process part specifications were generated. Using these as a basis, tooling was designed and fabricated to accomplish all operations. The development program began with these designs which were modified as the program progressed.

The development was an iterative process involving minor changes of tooling design and in-process part specifications to achieve the desired final case characteristics. Some of the detail effects of tool design changes will be briefly discussed.

### 6.1 Equipment

All development work was carried out using SCAMP tool modules and simulators.

A tool module is an assembly which contains all the tools necessary to perform a particular metal-working operation. By virtue of the design, tool adjustment is precisely controlled within the module and the whole assembly can be quickly installed in the SCAMP rotary presses. It can also be installed and used in a simulator, which is a single-station machine designed to duplicate the essential features (displacement, for example) of a rotary press.

The original reason for the tool module/simulator concept was to facilitate off-line tool check-out but it is also eminently suitable for tooling and process development, as in this program.

Experience has shown that there is good correlation between simulator and rotary press process performance so that the results of this program can be expected to be valid in predicting the effects of sub-module conversion.

A typical tool module is shown in Figure 3, and is shown installed in the appropriate simulator in Figure 4..

### 6.2 Effect of Tool Modifications

Changes were made to tool designs in three areas, affecting draw die angles, second draw punch profile and pre-pocket nib configuration.



FIGURE 3 TAPER TOOL MODULE

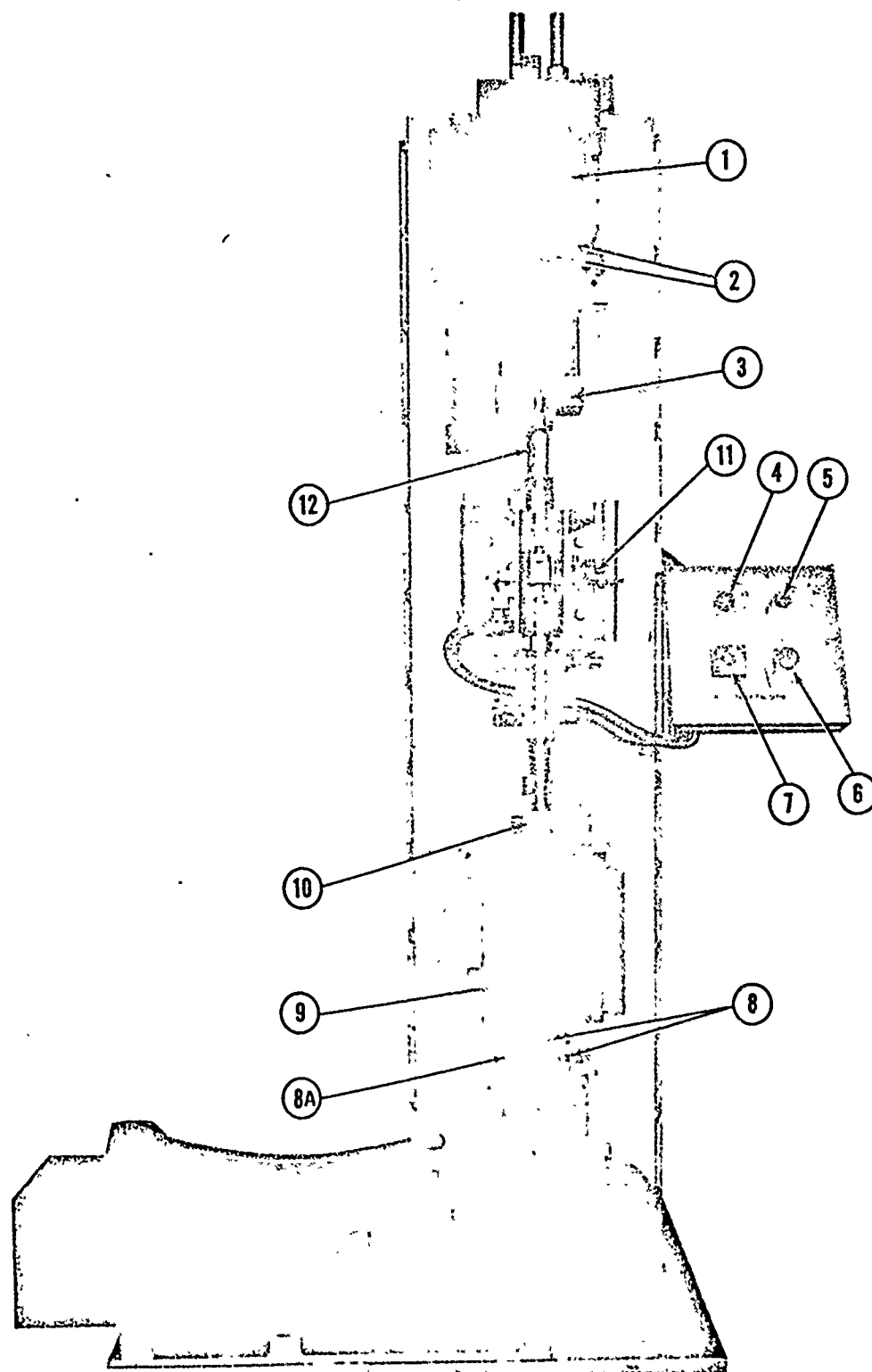


FIGURE 4 TAPER SIMULATOR AND TOOL MODULE





### 6.2.1 Draw Die Angles

During test series A, various combinations of draw die angles were tried to achieve what was judged to be a desirable base thickness (and consequently web thickness). The resultant selection was also used for test Series B. However, the incorporation of the L.C.A.A.P. process guide in the scope of work prior to Series C, necessitated further changes (reduction of die entry angles) to achieve the increased base (and web) thickness.

### 6.2.2 Second Draw Punch

The surface hardness measurements of series A and B showed a dip at the 0.75 inch point which could not be eliminated by adjustments of the body anneal coil. Although the resulting hardness profile was within the prescribed limits, it was decided that a better safety margin would exist if the dip could be alleviated.

The approach taken was to study the second draw and final draw tooling to establish the degree of metal-working occurring from the second draw part to the final draw part at several axial locations. This revealed that the metal at the 0.75 inch point had undergone less working than adjacent points and, in fact, did not fit a smooth curve drawn through all points.

Accordingly, the second draw punch profile was slightly modified and was successful in producing the desired result.

### 6.2.3 Pre Pocket Nib

Two nib configurations were tried initially, one having a straight taper profile and one having a hemispherical profile. The former was selected on the basis of its attaining a slightly greater head hardness. At the conclusion of test series B, ARRADCOM engineers detected an imperfection of the final pocket in the form of a small groove about half-way down the pocket and extending for about one-quarter of the circumference. Ammunition manufacturing terminology refers to this condition as a "rill", and is thought to cause primer leaks.

It was found that the alternate configuration did not produce the defect and it was used for the remainder of the program.



### 6.3 Final Tool Designs

A list of drawings of the final recommended tool designs and a reduced copy of each is included as Attachment 1. The original tracings were supplied to ARRADCOM.

## 7. ANNEALING DEVELOPMENT

### 7.1 Equipment

To properly conduct all the various annealing tests that had to be performed, a test rig was designed and constructed, see Figures 5, and 6. This facility has all the necessary instrumentation required to monitor and control all known annealing process parameters. Power, chain speed, water temperature and pressure, time until quench, and coil dimensions are all adjustable to allow a thorough evaluation of the pertinent variables so that the process could be optimized. A brief description of each of the components in the system is given below:

#### 7.1.1 Inverter

The inverter is a 200 kw, 10 kHz solid state unit with digital power monitor. It converts the 460 volt, 60 Hz, 3 phase electrical input into 440 volt, 10 kHz, single phase output, which is connected to the heat station.

#### 7.1.2 Heat Station

The heat station is used to obtain an oscillating, or resonant, circuit with the induction coil so that efficiency is maximized. The impedance matching of the electrical characteristics of the coil is accomplished through the use of an auto-transformer with multiple taps to select the voltage, and sufficient capacitance in 220, 440, and 800 volt banks to vary the frequency. With this arrangement, a wide range of coil sizes and configurations can be efficiently tuned.

#### 7.1.3 Control Panel

The control panel has all the necessary switches, indicator lights and buttons that are required to operate the inverter and heat station. Two analog meters monitor voltage and frequency, and a digital meter monitors power output. The panel also has the controls needed to operate the recirculating water system, the quench chamber, compressed air for the blow-off chamber, and the chain drive motor.

#### 7.1.4 Quench and Blow-off Chamber

The quench and blow-off chamber, see Figure 7, is built out of aluminum plate with acrylic windows in the front and back to allow visual inspection of the quenching process. The entire unit is mounted on

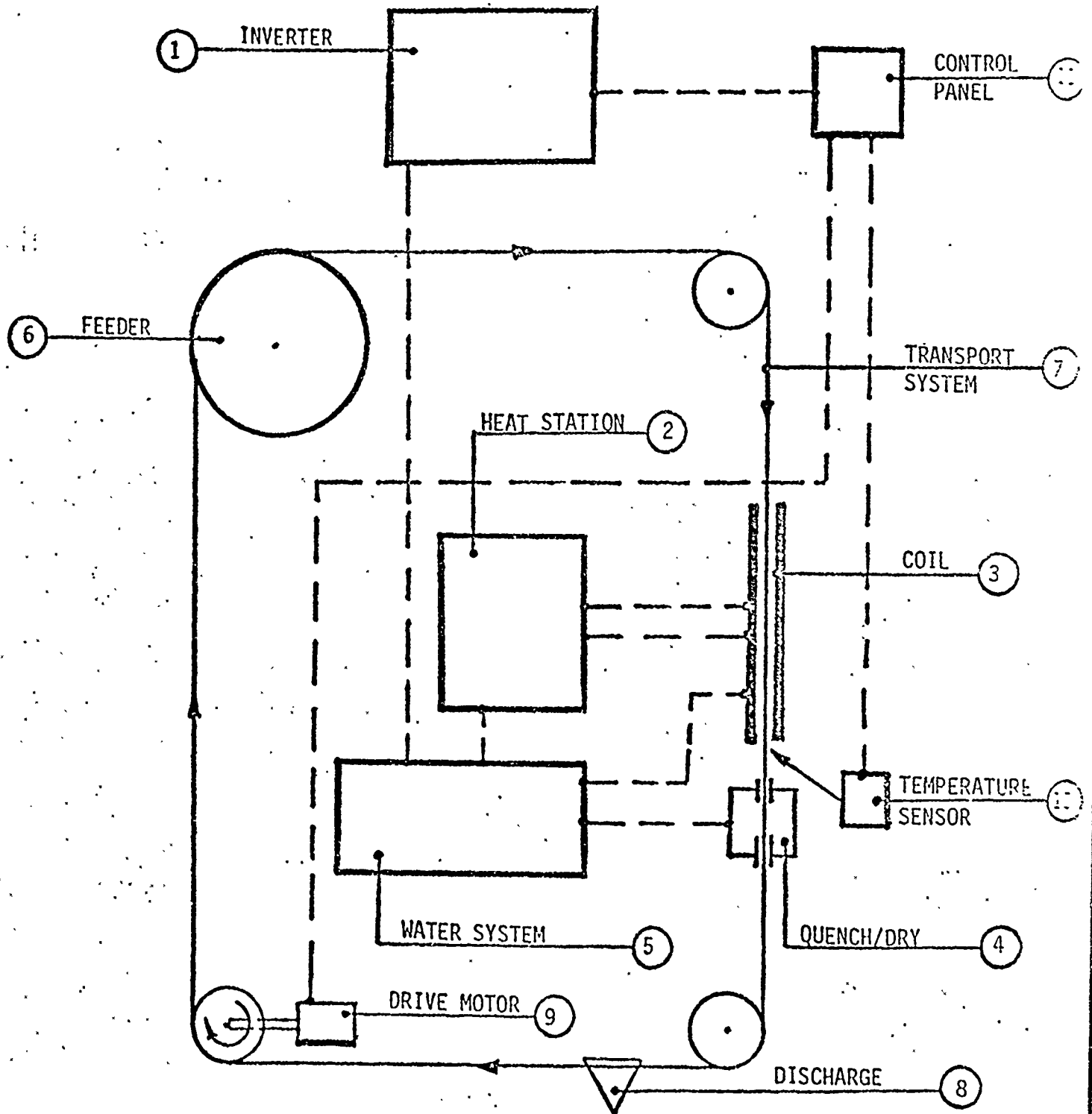


FIGURE 5 INDUCTION ANNEAL SYSTEM DIAGRAM

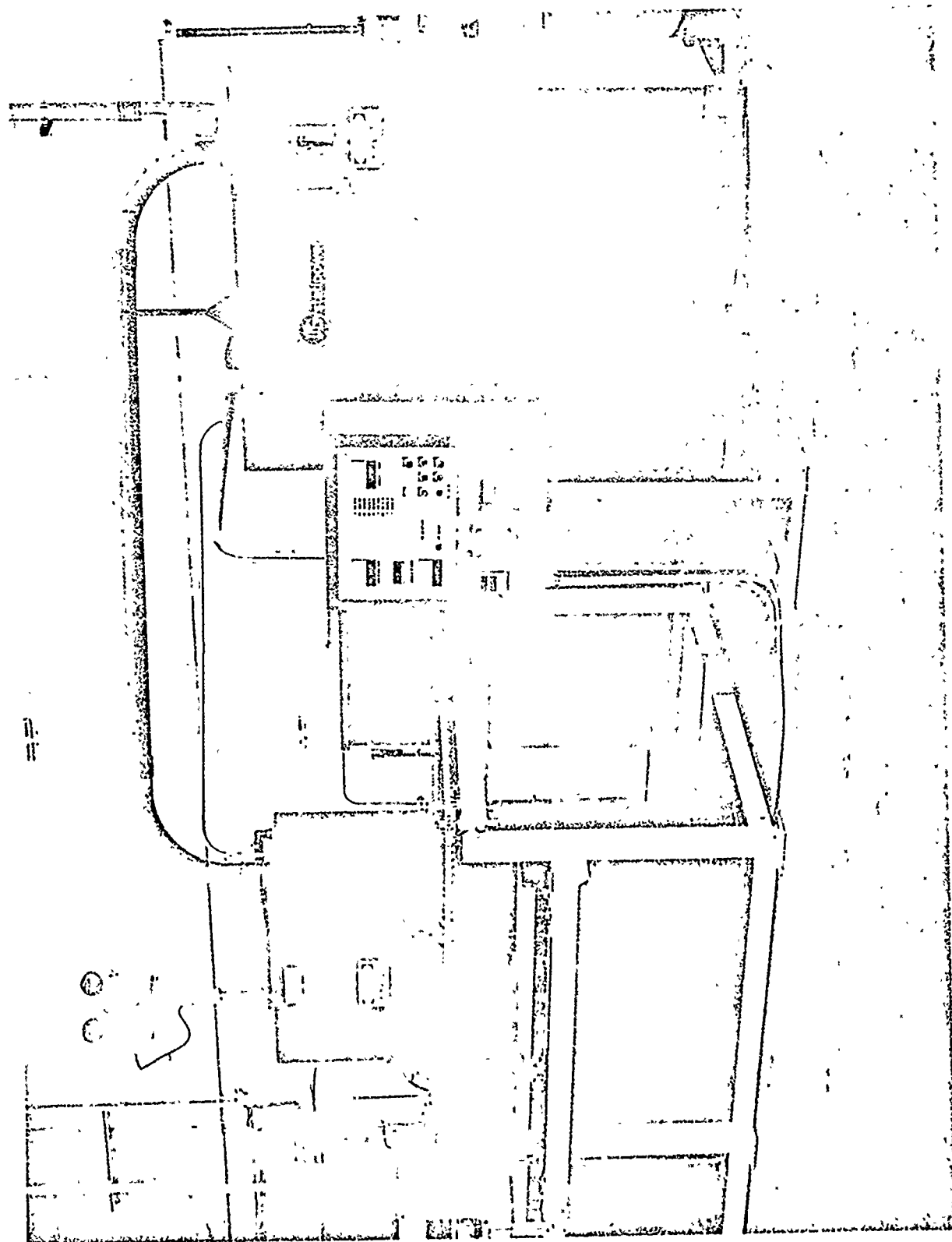


FIGURE 6 • CARTRIDGE CASE INDUCTION ANNEAL UNIT

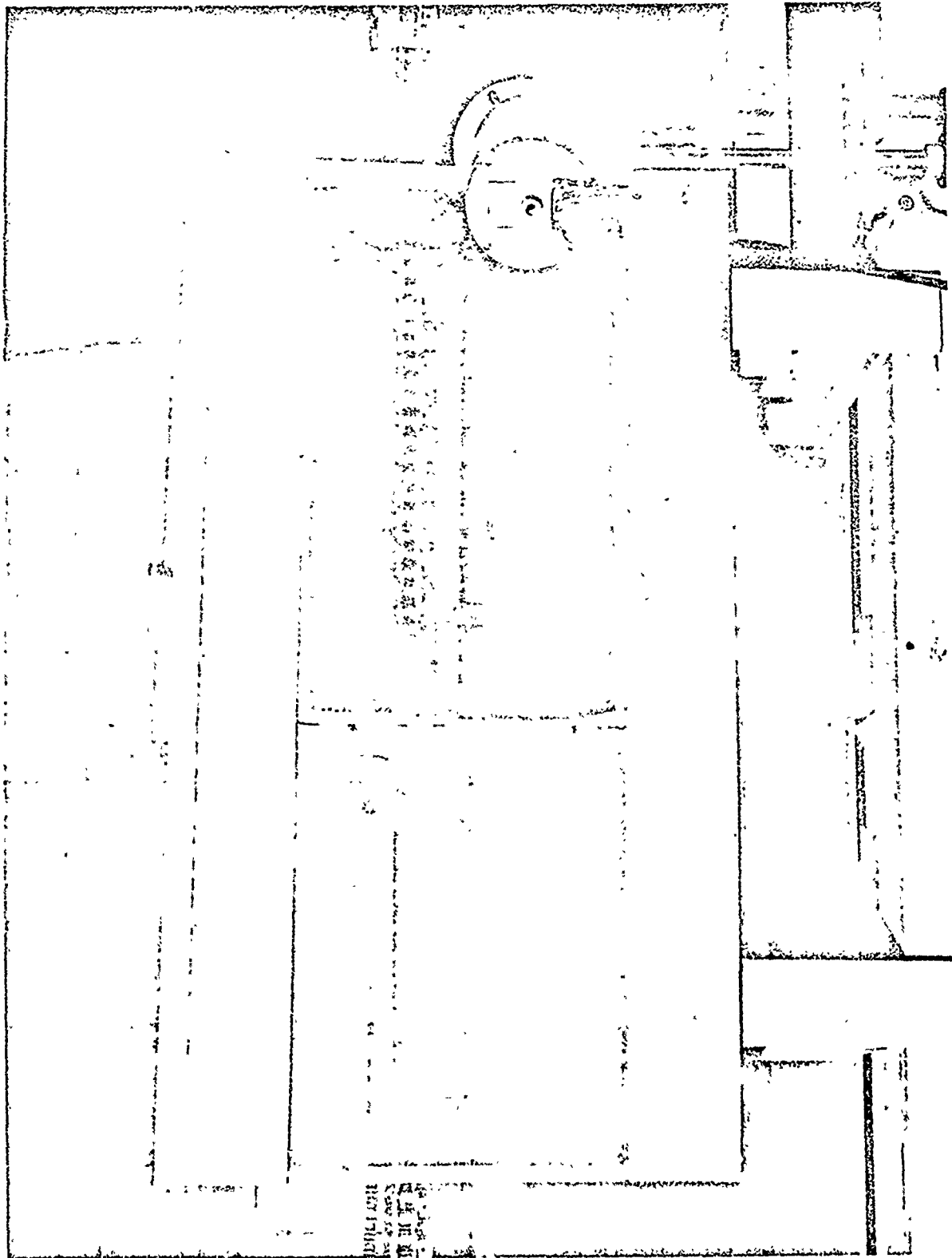


FIGURE 7 • CARTRIDGE CASE QUENCH UNIT

moveable slides so that it can be moved toward or away from the coil. In this manner, the time required for full quenching can be varied to provide the optimum effect.

The quench chamber consists of a series of square-pattern spray nozzles arranged such that the cases are cooled quickly and uniformly. The blow-off chamber uses a series of wide-angle, flat-pattern air nozzles providing compressed air to dry the cases. All the nozzles are mounted in manifolds with a flexible connector so that they may be repositioned easily to accomodate the various annealing operations.

#### 7.1.6 Transport System

Two 40-foot sections of nickel plated chain are used. The first chain has stainless steel pins on which the second draw parts are placed for the interdraw anneal operation. The second chain has beryllium copper clips which engage the extractor groove and is used for the body anneal, stress relief, and neck and mouth anneal operations. In both cases, part spacing is 0.75 inch and chain speed is 15 inches per second.

#### 7.1.7 Accumulator Water System

An accumulator tank and a recirculating water system was incorporated to maintain constant cooling water temperature and pressure. The water from the inverter, heat station and coil is recirculated, but the water from the quench, which may wash off dirt, oxides or metal particles from the cases, is dumped into the drain to avoid contaminating or raising the conductivity of the recirculating water.

#### 7.1.8 Principle of Operation

Although the tests were run on an intermittent basis, the characteristics of a continuous system were properly simulated. This was achieved by sandwiching the test pieces between quantities of non-test pieces. The purpose of the latter was to achieve coil load stability before the first test piece entered the coil, and maintain it until the last test piece exited.



With the 0.75 inch spacing and 15 inches per second chain speed, the simulated production rate was 1200 parts per minute.





## 7.2 Induction Coils

There are four coils used for the induction heat treating operations.

These are:

1. interdraw anneal coil
2. body anneal coil
3. stress relief coil
4. neck and mouth anneal coil

Each coil is a channel configuration with multiple turns (except for the single-turn neck and mouth coil). In this manner, each turn only heats a portion of the case so that reliance on conduction and the effects of ambient conditions are minimized, while efficiency is improved.

Each unit has positive and independent adjustment of the vertical and horizontal position of each turn to provide more predictable and repeatable results. The relatively short coil lengths also make it easier to adjust and align the assembly. The coils are mounted in box-type frames to provide a structure having rigidity together with visibility and accessibility. The top of this box assembly houses the chain guide as an integral part of the structure to ensure case-to-coil position accuracy.

Each coil is mounted on a wooden spacer to facilitate simple removal and installation. Each spacer is mounted on an adjustable base plate to permit proper alignment of the coil assembly with the chain.

A list of coil drawings and a reduced copy of each assembly drawing is contained in Attachment 2.

### 7.2.1 Interdraw Anneal Coil

The interdraw anneal coil is two turns, 72 inches long and has iron lamination flux concentrators on the top turn. The entire top turn is utilized to heat the 1/4 inch point since the mass of metal in the base acts as a heat sink. The iron laminations direct and concentrate the lines of flux into this area. The bottom turn is slanted slightly to heat the rest of the case. The material for the case guide is a silicone/glass laminate that is nonconductive, withstands high temperatures, and has fairly good wear properties.



#### 7.2.2 Body Anneal Coil

The body anneal coil is three turns and is 36 inches long. As with the interdraw anneal coil, the top turn is used solely to heat the 1/4 inch point, with the other two turns heating the rest of the case.

#### 7.2.3 Stress Relief Coil

The stress relief coil is four turns and is 18 inches long. During the stress relief operation, the cases are heated to about 600°F to remove any residual stresses.

#### 7.2.4 Neck and Mouth Anneal Coil

The neck and mouth anneal coil is a single turn and is 18 inches long. This coil is used to anneal only the 1-7/8 inch point, whose hardness was raised significantly in the tapering operation. The neck and mouth anneal also imparts the iris on the mouth of the case. A typical coil assembly is shown in Figure 8.

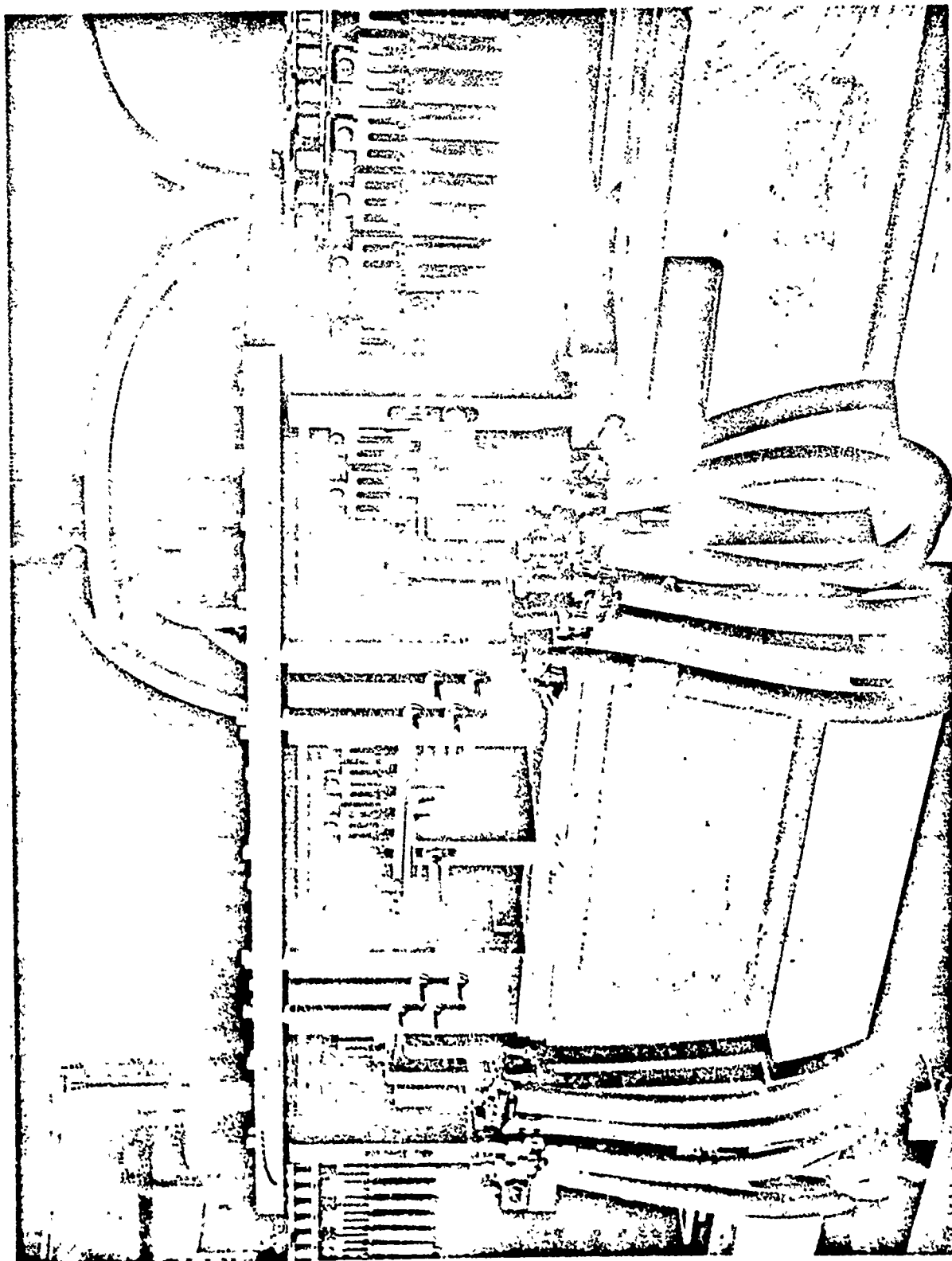


FIGURE 8 . CARTRIDGE CASE INDUCTION COIL ASSEMBLY

### 7.3 Final Configuration

As with the tooling, the anneal development was an iterative process carried out until the desired characteristics were achieved. The final coil settings are included on the appropriate assembly drawing. It should be noted that the settings should be used only as a guide. Other adjustments may be used depending on ambient conditions, water cooling effectiveness and changes in workpiece characteristics caused by tool wear.

Hardness readings were taken on a Wilson Tukon Hardness Tester and grain structures were observed using a Bausch and Lomb metallograph.

#### 7.3.1 Interdraw Anneal

The objective of this development was to satisfy the specified grain structure on the final case. The specification is comparative in nature, with the actual grain size having to fall between a minimum and a maximum (as defined by reference photomicrographs) at each location.

It was found that no discernible grain distortion occurred in final draw or subsequent operations.

The only unexpected factor was that the required power output was 216 KW. This was 108% of the induction unit rating of 200 KW which was originally estimated to be adequate. Such a condition would be undesirable on a long term basis. However, the unit is basically a 250 KW model de-rated and could easily be upgraded to its normal rating.

#### 7.3.2 Body Anneal

Consistent with previous experience, fulfillment of hardness gradient specifications was a time consuming process.

Power required was 112 KW.

#### 7.3.3 Stress Relief

This operation is such that coil and power settings are not critical.



#### 7.3.4 Neck and Mouth Anneal

The main problem encountered here was in maintaining an even and consistent iris. It is believed that the major cause was inconsistency of cleaning prior to the anneal and that this condition would not apply in a properly functioning production process.

Power required was 98 KW.

Recommended hardness profiles following the various anneals are shown with the in-process data of Section 8.

Note that these profiles are advisory only.



#### 7.4 Void Test

Five tests were performed to evaluate the effects of voids (missing cases) on the ability of the annealing system to correctly heat treat the 7.62 mm cases. The five tests were performed in compliance with contract DAAK10-78-C-0165 modification P00001, and are repeated here for the convenience of the reader:

- A. All twenty-four stations filled. Hardness data to be used as base line for Test B and D.
- B. Four voids spaced evenly throughout the twenty-four station positions on the chain. Anneal power to be adjusted to the base line hardness data established in Test Condition A.
- C. Four consecutive voids in the twenty-four station positions on the chain. Anneal coil power setting to be the same as used in Test Condition B.
- D. Six voids evenly spaced throughout the twenty-four station positions on the chain. Anneal coil power to be adjusted to the base line hardness data established in Test Condition A.
- E. Six consecutive voids out of the twenty-four station positions on the chain. The anneal coil power settings to be the same as used in Test Condition D.

Each test was run five times and six samples were taken from each test. The 1/2 and 1-1/2 inch points were checked for hardness on each of the 150 test pieces. To obtain results that reflected the worst possible condition, the samples were taken from the positions immediately adjacent to the voids. For example, in test (C), three groupings of 24 cases were run with a void of four missing cases in the middle of each group. Therefore, if each set was numbered 1 to 24, the cases in the position of 11 to 14 were removed to act as the void, and the cases in the positions of 10 and 15 were removed from each group as the test samples.

The results are summarized in Attachment 7, with the hardnesses given for each test being the average of 30 cases.



Because of the large number of samples and the time consuming nature of reading hardness, measurements were limited to the  $\frac{1}{2}$  inch and  $1\frac{1}{2}$  inch locations.

By comparing tests A, B and D, it is seen that the evenly spaced voids can be stabilized at the correct hardness by power adjustment to well within experimental scatter.

On the other hand, comparing C with B, it is seen that the A consecutive void arrangement produces a severe drop in hardness at the  $\frac{1}{2}$  inch location of about 26 DPH, and very little change at the  $1\frac{1}{2}$  inch location.

As may be expected, the condition is worse with 6 consecutive voids (comparing E with D), which produces a hardness drop of about 40 DPH at the  $\frac{1}{2}$  inch location and a slight drop at the  $1\frac{1}{2}$  inch location.



8. IN-PROCESS PART DEFINITIONS

As mentioned in section 6, the program began with tentative in-process specifications. As with the tooling, minor changes were made as the process development progressed. The final recommended definitions not covered by the L.C.A.A.P. in-process or final case dimensions are included as Attachment 3.

Also included for reference are copies of the cup drawing 10522459 and the case drawing 10521997.





## 9. FINISHED PART INSPECTION

A small random sample from the same batch as the 1,000 parts supplied to ARRADCOM was inspected for compliance to the required specifications.

### 9.1 Dimensional

Measurements are made on the in-process parts and on the finished cases. The resulting data is included in Attachment 4.

### 9.2 Metallurgical

Measurements of external surface hardness and internal head hardness, together with typical microphotographs of grain structure are included as Attachment 5.



10. TEST FIRINGS

A small sample from test series C was submitted to H.P. White Laboratory Inc. for test firing. They were loaded to M80 high pressure test specifications and fired in a pressure barrel. No deficiencies were noted in the subsequent inspection.

The test report is included as Attachment 6.

## 11. SCAMP EQUIPMENT CHANGES

### 11.1 Tooling

SCAMP tool modules were used throughout. Relative to 5.56 mm production, the additional draw operation was accomplished by using a standard first draw module and equipping it with second draw tooling; the pre-pocket tooling was installed in a standard header module.

The only change made in the tool module area related to non-metalworking components involved draw punch alignment. Test series A and B had shown some difficulty in maintaining wall thickness variation tolerance of the final draw part. Investigation showed this to be caused by punch-to-die misalignment. This, in turn, resulted from the restricted length of the punch shank-to-gland-to holder engagement and the clearances involved, which induced the misalignment when the retaining nut was tightened.

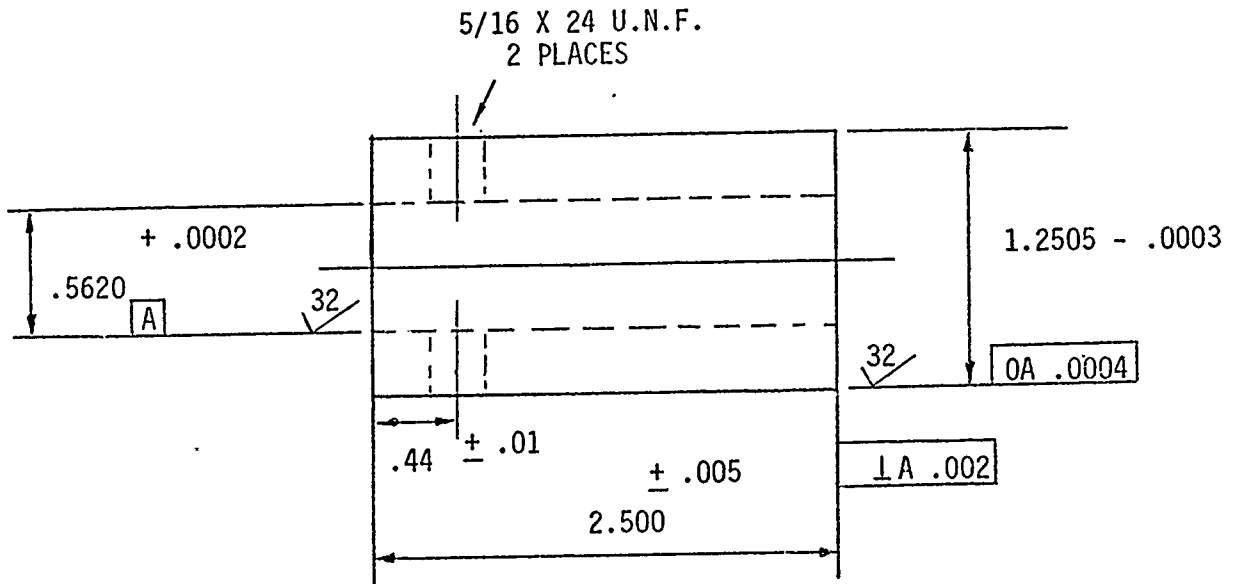
This condition was corrected by installing a re-designed sleeve which maximized engagement length. This modification is shown in Figure 9.

It may be noted that the sensitivity to misalignment is not present in the existing G+W 7.62 mm two-draw process which uses a cup with greater height: diameter ratio.

### 11.2 Basic Equipment

Relative to the 5.56 mm SCAMP case sub-modules operating at L.C.A.A.P., additions to the basic equipment would be provisionally as follows:

1. Draw press to perform the additional draw operation.
2. Additional drive motor and control system.
3. Interdraw anneal station consisting of 250 kw power unit, heat station, coil assembly, wash station, quench and blow-off stations, plus entry and exit re-spacers.
4. Header press to perform the pre-pocket operation.
5. Two transfer turrets to correct the pass-line changes introduced at the additional draw and pre-pocket presses.



MATERIAL

PRE-HEAT TREATED

4130 Rc28 - 32 or Equivalent

FIGURE 9 DRAW PUNCH SLEEVE

### 11.3 Layout

A possible equipment layout is shown schematically in Figure 10.

In practical terms, location of the two additional presses could be most effectively provided for by excavation of the existing pit. The pit does have one "spare" station, so that excavation would be limited to extension by one station upstream.

The details of the sub-module changes, such as drive re-arrangement, provision of transport system supports and utilities are properly the subject of a study beyond the scope of this contract.

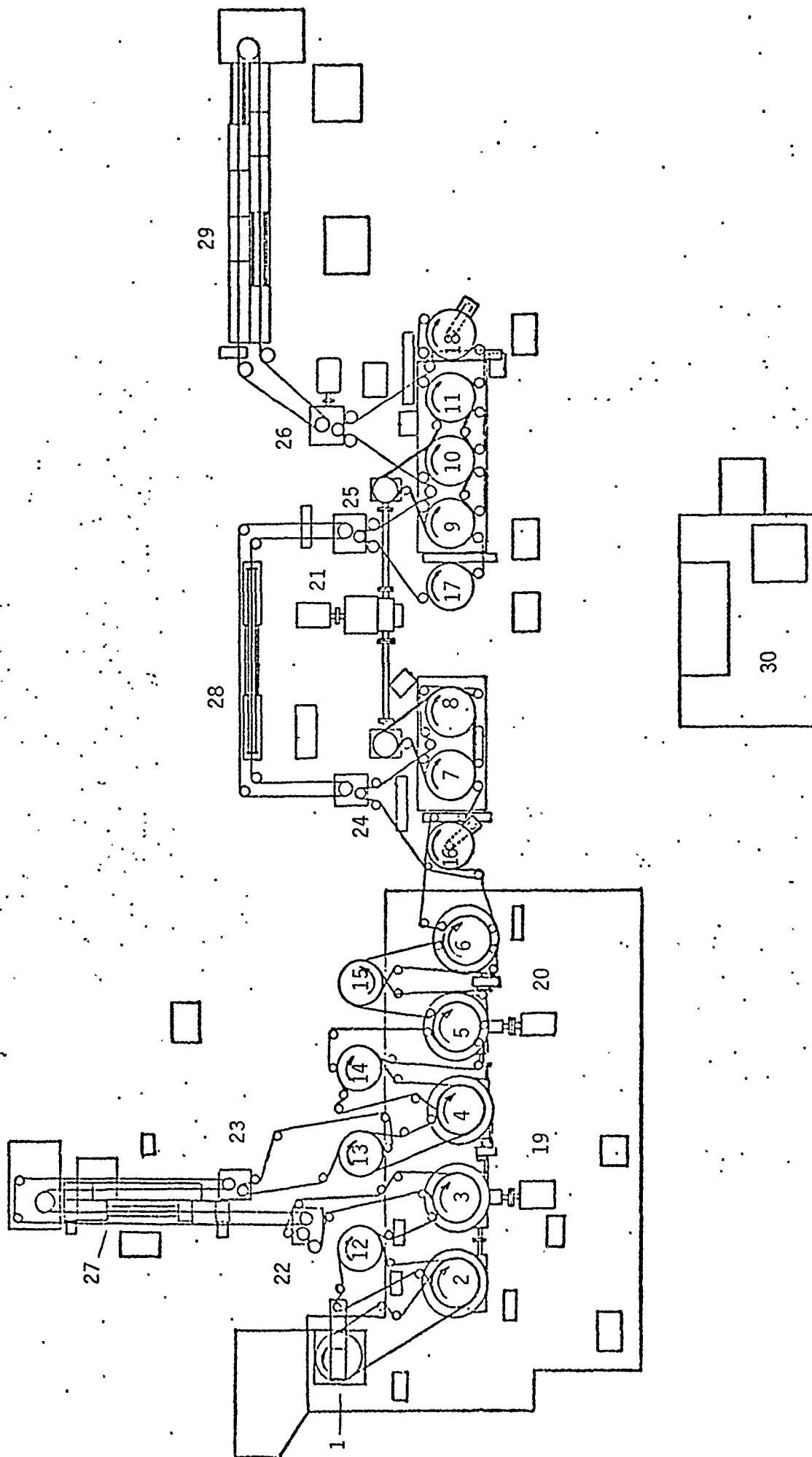


FIGURE 10 . EQUIPMENT LAYOUT SCHEMATIC

Key

1. Cup Feeder
2. Initial Draw Press
3. Second Draw Press
4. Final Draw Press
5. Pre-Pocket Press
6. Header Press
7. Head-Turn Press
8. Pierce Press
9. First Taper Press
10. Second Taper Press
11. Trim Press
12. Eject-Transfer Turret
13. Eject-Transfer Turret
14. Eject-Transfer Turret
15. Eject-Transfer Turret
16. Eject-Transfer Turret
17. Eject-Transfer Turret
18. Eject-Transfer Turret
19. Drive Motor
20. Drive Motor
21. Drive Motor
22. Re-Spacer
23. Re-Spacer
24. Re-Spacer
25. Re-Spacer
26. Re-Spacer
27. Interdraw Anneal Station
28. Body Anneal Station
29. Stress Relief Anneal, Neck & Mouth Anneal, & Clean Station

FIGURE 10 EQUIPMENT LAYOUT SCHEMATIC  
(Continued)

## 12. CONCLUSIONS

The program has demonstrated the feasibility of producing 7.62 mm M80 cartridge cases to U.S. N.A.T.O. specifications on a SCAMP sub-module at 1200 parts per minute.

All final case dimensional and metallurgical specifications can be fulfilled without exception.

A critical factor in the process was the successful development of induction heating to stimulate re-crystallization and grain growth with a continuous work-piece flow in less than 5 seconds.

All tools are compatible with existing tool modules and sub-module presses and their fabrication requires only normal techniques.

Because of the stipulated use of the standard U.S. cup and incorporation of a pre-pocket operation, two additional presses are required and excavation of the pit will be necessary.

Logically, this program should be followed by a design study which would be aimed at developing a realistic layout of the converted sub-module.





Advanced Development and Engineering Center

No. 30012

101 Chester Road • Swarthmore, Pennsylvania 19081

ATTACHMENT 1 TOOL DRAWINGS

First Draw

Punch	11831357
Bottom Die	11831578
Middle Die	11831579
Top Die	11831360
Stripper	11831361
Retainer	11831362

Second Draw

Punch	11831364
Bottom Die	11831365
Middle Die	11831366
Top Die	11831367
Stripper	11831368
Retainer	11831369

Third Draw

Punch	11831371
Bottom Die	11831372
Middle Die	11831373
Top Die	11831374
Stripper	11831375
Stripper	11831376
Retainer	11831377



Pocket

Stem	11831379
Bunter	11831381

Head

Stem	11831384
Bunter	11831385

Pocket/Head

Die	11831380
Retainer Nut	11831382

Head Turn

Mandrel	11831387
Form Tool	11831388
Stripper	11831389
Guide Roller Pin	11831390
Plug	11831391
Guide Holder	11831392
Guide Roller Assembly	11831393

Pierce

Punch	11831395
Guide Punch	11831396
Stem	11831397
Stripper	11831398



First Taper

Body Die	11831400
Shoulder Die	11831401
Mandrel	11831402

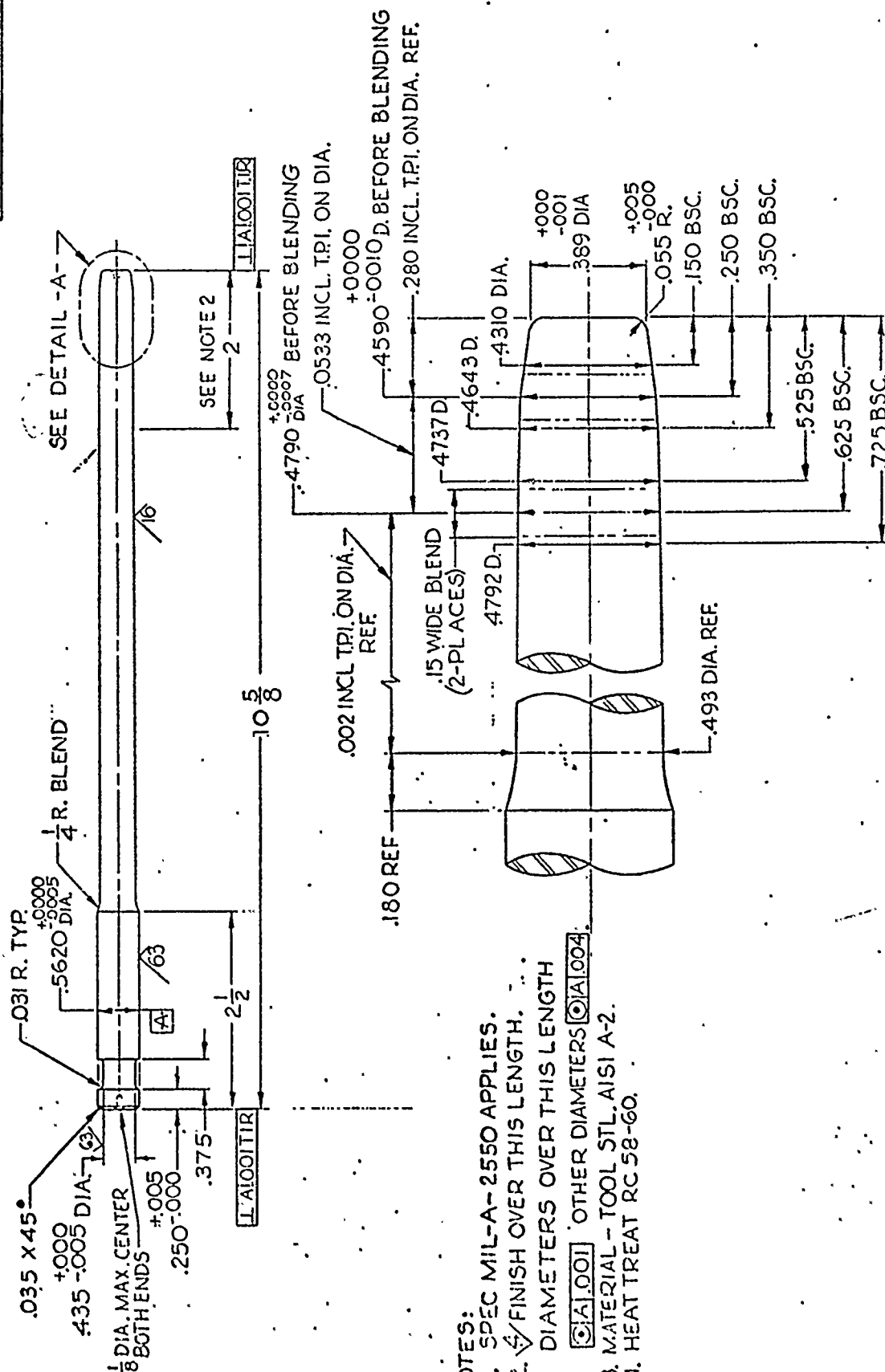
Second Taper

Body Die	11831403
Shoulder Die	11831404
Mandrel	11831405

First/Second Taper

Mandrel Seat	11831406
Sleeve	11831407

REVIEWS		
SYN	DESCRIPTION	DATE
		APPROX. 4



## NOTES:

1. SPEC MIL-A-2550 APPLIES.
2.  $\sqrt{\text{FINISH OVER THIS LENGTH.}}$   
DIAMETERS OVER THIS LENGTH
3. MATERIAL - TOOL STL, AISI A-2.
4. HEAT TREAT RC 58-60.

①	A	001
②	A	004

OTHER DIAMETERS

3. MATERIAL - TOOL STL AISI A-2.

4. HEAT TREAT RC 58-60.

DETAIL-A-  
SCALE 4/1

PART NO. 11831357

**U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND:  
DOVER, NEW JERSEY 07801**

7.62 MM: CARTRIDGE CASE  
PUNCH

LIST OF DATA

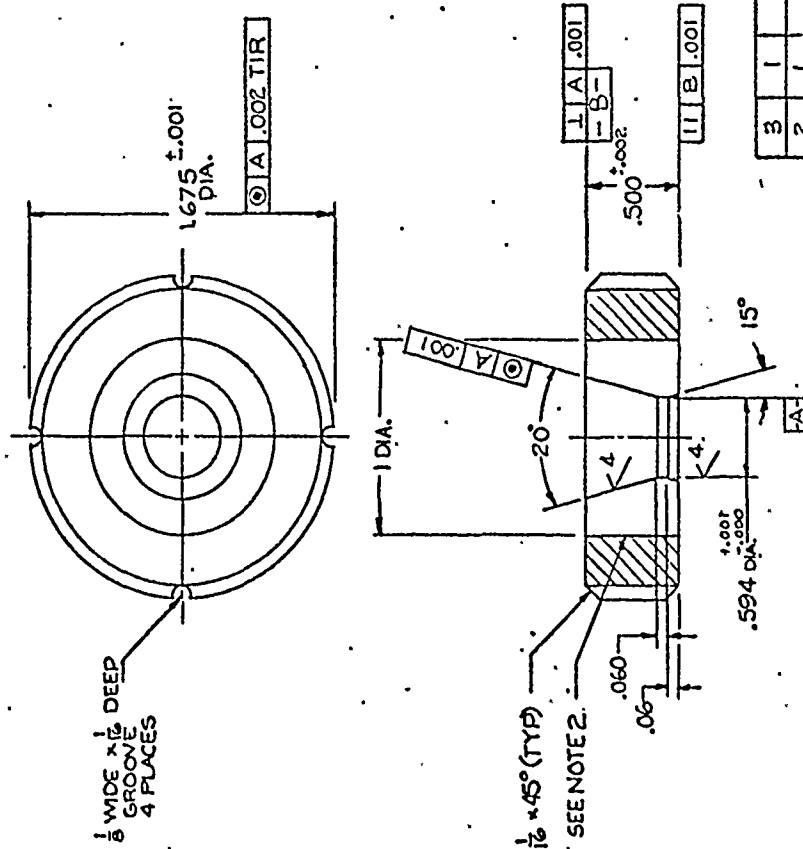
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# NOTES:

- 1- SPEC. MIL-A-2550 APPLIES
- 2- INSERT TO BE .006 TO .008 SHRINK FIT IN HOLDER AND FLUSH WITH HOLDER
- 3- FINISH  $\frac{3}{4}$  UNLESS NOTED
- 4-



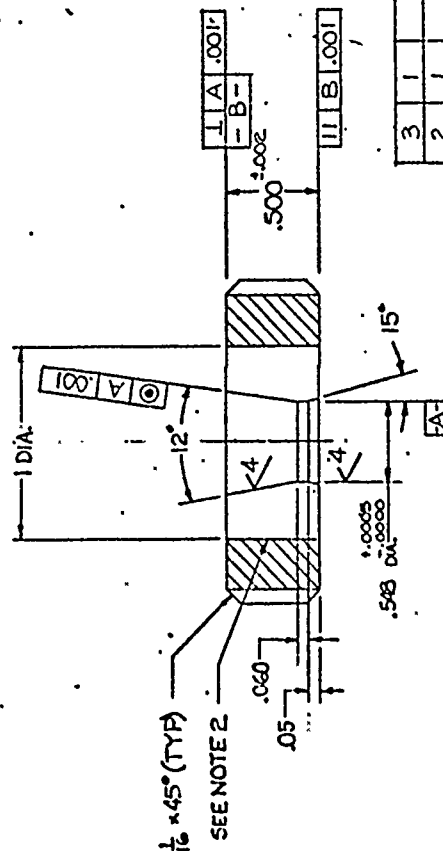
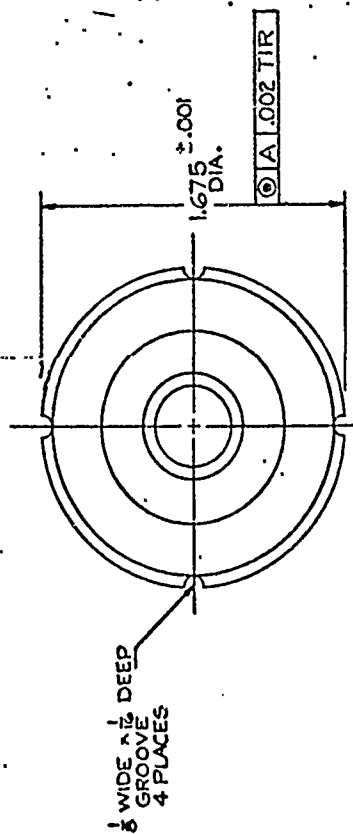
ITEM NO.	QTY. REQ.	CODE IDENT. NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
3	1		11831358-3	INSERT	C-10	CARBIDE
2	1		11831358-2	HOLDER	ASTOR-R-55	TOOL STL.
1	1		11831358-1	BOTTOM DIE		

## PARTS LIST

PART NO. 11831358		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
ORIGINAL DATE OF DRAWING 79-4-6		7.62 MM CARTRIDGE CASE BOTTOM DIE FIRST DRAW	
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS $\pm .004$ FRACTIONS $\pm \frac{1}{64}$ ANGLES $\pm \frac{1}{2}^\circ$	CHECKER J.D. 12-4-7	C 19200 T 11831358	
MECHANICAL PROPERTIES	DRAPPMAN JD	C 19200 T 11831358	
YP	ENGR	C 19200 T 11831358	
TS	ENGR	C 19200 T 11831358	
HT	ENGR	C 19200 T 11831358	
HA	ENGR	C 19200 T 11831358	
HT	ENGR	C 19200 T 11831358	
HEAT ASSY	USED ON	C 19200 T 11831358	

REV	DESCRIPTION	DATE	APPROVAL
1			

- NOTES:
- 1 - SPEC MIL-A-2550 APPLIES
  - 2 - INSERT TO BE .006 TO .008 SHRINK FIT IN HOLDER AND FLUSH WITH HOLDER
  - 3 - FINISH  $\pm$  UNLESS NOTED



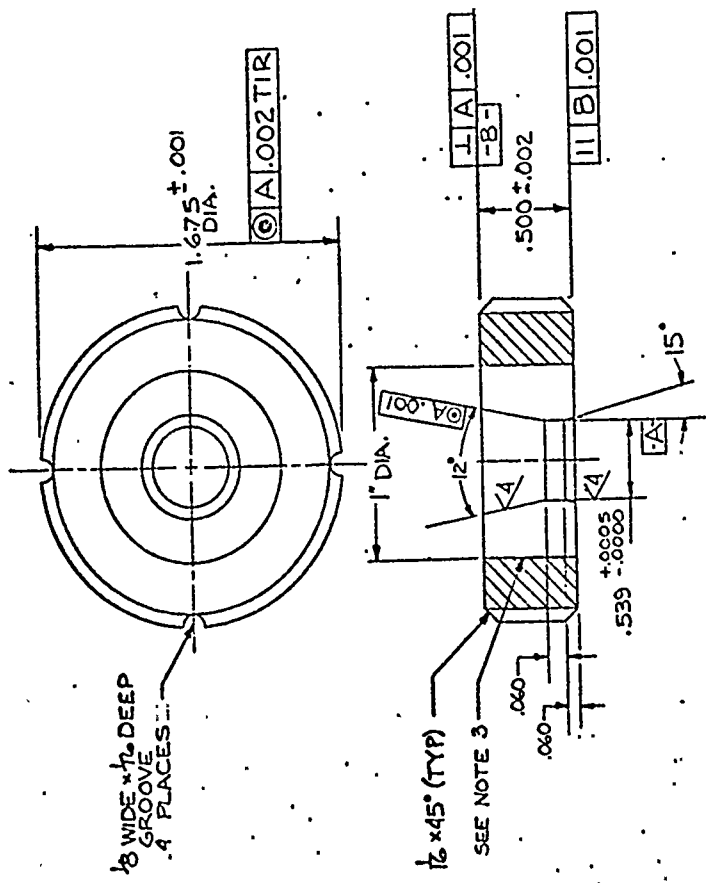
ITEM NO.	QTY. REQ.	CODE IDENT. NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
3	1		11831359-2	INSERT	C-10	CARBIDE
2	1		11831359-2	HOLDER	11831359-2	TOOL STL
1	1		11831359-1	MIDDLE DIE		

# PARTS LIST

DO NOT SCALE DRAWING		ORIGINAL DATE OF DRAWING		PART NO. 11831359	
UNLESS OTHERWISE SPECIFIED		79-4-7		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND	
DIMENSIONS ARE IN INCHES		DRAFTSMAN JD		DOVER, NEW JERSEY 07801	
TOLERANCES ON DECIMALS $\pm$ .004		CHECKER		7.62 MM CARTRIDGE CASE	
FRACTIONS $\pm$ 1/64 ANGLES $\pm$ 1/2°		ENGR		MIDDLE DIE	
		ENGR		FIRST DRAW	
MECHANICAL PROPERTIES		SIZE		C 19200	
VP		CORE IDENT NO		T 11831359	
TS		SCALE		2:1	
ELC		UNIT WT.		SHEET	
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D1					
D2					
D3					
HEAT TREAT					
UTLID 001					
APPROVAL					

SIM	DESCRIPTION	DATE	APPROVAL
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- NOTES:
1. SPEC MIL-A-2550 APPLIES.
  2. FINISH  $\frac{32}{\sqrt{R}}$  UNLESS NOTED.
  3. INSERT TO BE .006 TO .003 SHRINK FIT IN HOLDER AND FLUSH WITH HOLDER.



ITEM NO.	QTY. REQ.	CODE IDENT.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
3	1		11831360-3	INSERT	C-10	CARBIDE
2	1		11831360-2	HOLDER	AISI-O1	TOOL STEEL
1	1		11831360-1	TOP DIE		

PART NO. 11831360

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

7.62 MM CARTRIDGE CASE  
TOP DIE  
FIRST DRAW

ORIGINAL DATE OF DRAWING  
79-4-5

DO NOT SCALE DRAWING  
UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES  
TOLERANCES ON DECIMALS = .004  
FRACTIONS = 1/4 ANGLES = 1/2

MECHANICAL PROPERTIES

YP TS EL2 RA BH J01

APPROVAL

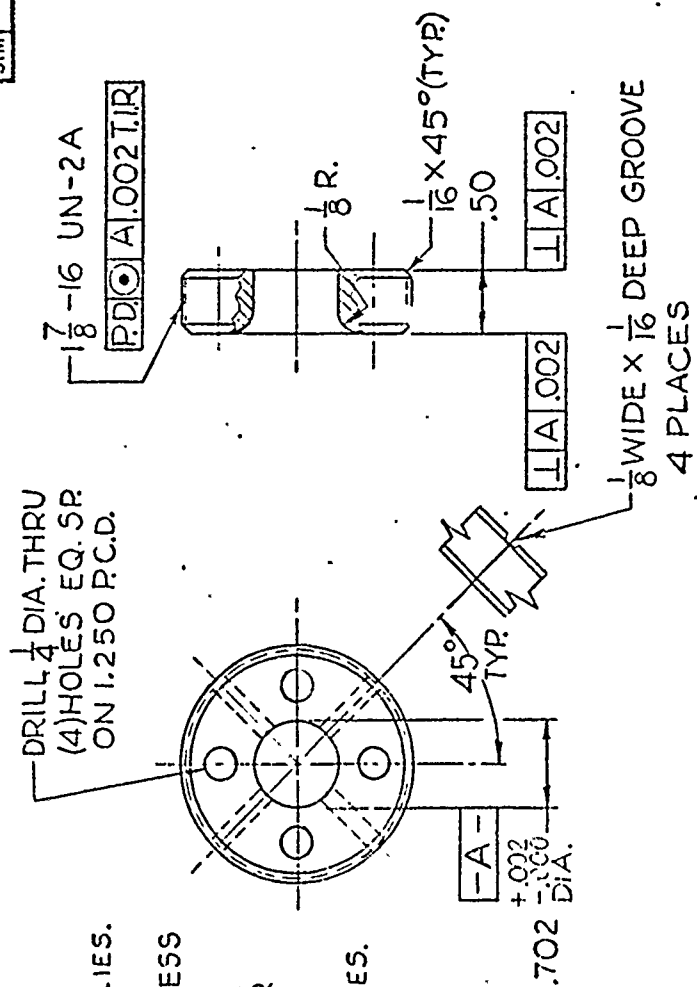
DATE

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REVISIONS		
SYN	DESCRIPTION	DATE
		APPROVAL

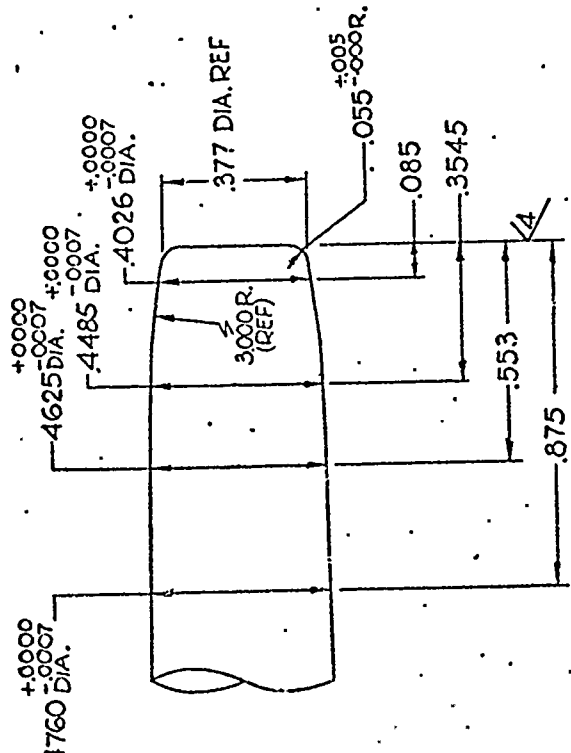
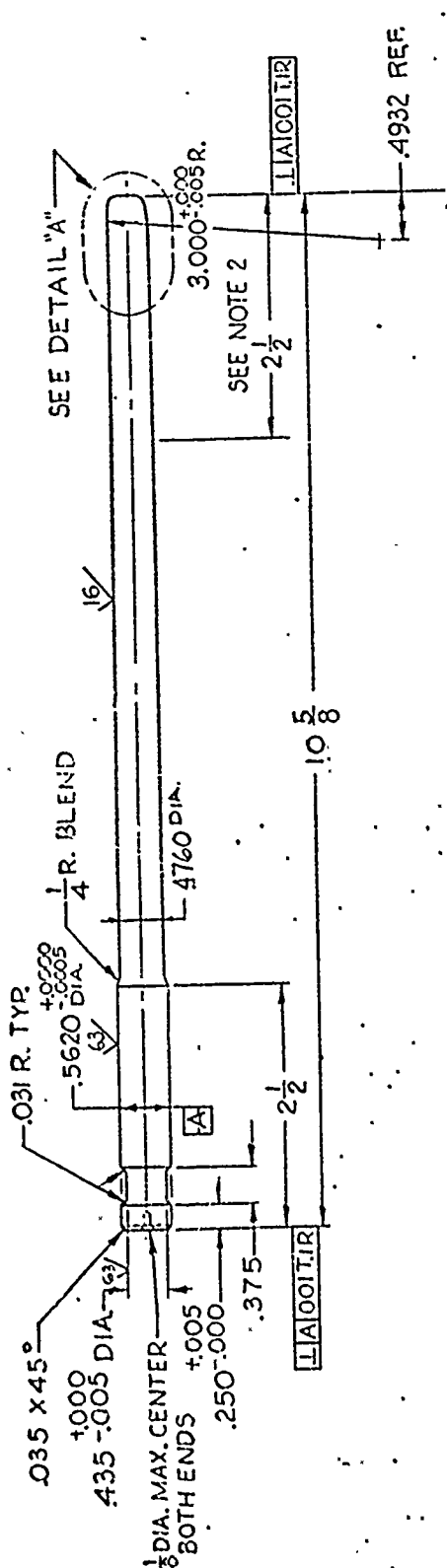


- NOTES:
1. SPEC MIL-A-2550 APPLIES.
  2. FINISH-CADMIUM PLATE
  3. MACHINE FINISH UNLESS OTHERWISE NOTED.
  4. HEAT TREAT RC 35-38.
  5. DIMENSIONS ARE AFTER PLATING.
  6. MATERIAL AISI 4140
  7. BREAK ALL SHARP EDGES.

PART NO. 11831362

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		ORIGINAL DATE OF DRAWING 79-4-2		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS = .004 FRACTIONS = 1/16 4 ANGLES = 1/2°		MECHANICAL PROPERTIES		APPLICATION	
7.62 MM CARTRIDGE CASE DIE RETAINER GUIDE FIRST DRAW		DRAFTSMAN ACH		CHECKER E.C. T 79-4-5		YP		NEXT ASSY	
		ENGR		ENGR		TS		USED ON	
		ENGR		ENGR		EL2			
						RA			
						BH			
						PH			
SIZE B		CODE IDENT NO. 19200		T		11831362			
SCALE FULL		UNIT WT		SHEET					

SYM	



NOTES:

1. SPEC. MIL-A- 2550 APPLIES.
2.  $\sqrt{4}$  FINISH OVER THIS LENGTH.  
DIAMETERS OVER THIS LENGTH .  
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ØA.001
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OTHER DIAMETERS 

ØA.004
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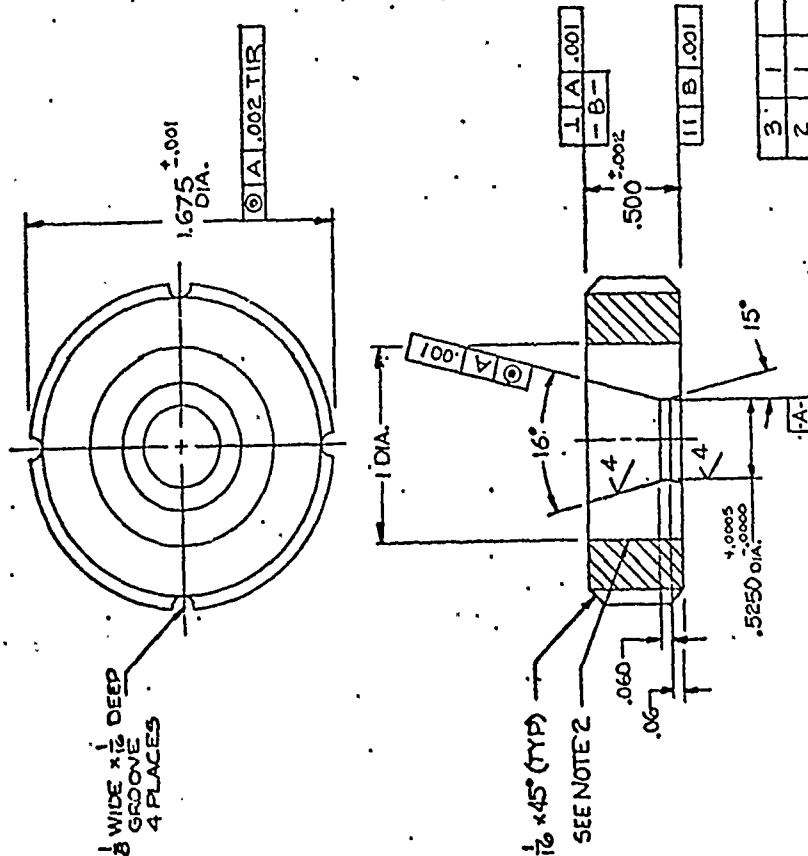
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3. MATERIAL SPEC-TOOL STEEL AISI A-2.
4. HEAT TREAT - RC 58-60.

DETAIL 'A'  
SCALE 4/1

PART NO. 11831364

MECHANICAL PROPERTIES		DO NOT SCALE DRAWING		ORIGINAL DATE OF DRAWING		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07201	
YP		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		79-4-11		7.62 MM CARTRIDGE CASE PUNCH SECOND DRAW	
TS		TOLERANCES ON DECIMALS = .004 FRACTIONS = 1/16 ANGLES = 1/2°		DRAFTSMAN		CHECKER	
EL2				ENGR		ENGR	
HA				ENGR		ENGR	
BM						SITE CODE IDENT NO	
HT						C 19200 T 11531364	
HEAT TREAT						DATE OF TEST	
REMARKS						TEST NO	

- NOTES:  
 1-SPEC. MIL-A-2550 APPLIES  
 2-INSERT TO BE .006 TO .008 SHRINK FIT  
 IN HOLDER AND FLUSH WITH HOLDER  
 3-FINISH  $\pm .001$  UNLESS NOTED



ITEM NO.	QTY. REQ.	CODE IDENT. NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
3	1		11831365-3	INSERT		C-10
2	1		11831365-2	HOLDER		AN5101R45-20 TOOL ST.
1	1		11831365-1	BOTTOM DIE		

# PARTS LIST

PART NO. 11831365

U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
 DOVER, NEW JERSEY 07801

7.62 MM CARTRIDGE CASE  
 BOTTOM DIE  
 SECOND DRAW

DATE CODE IDENT. NO. T 11831365  
 ALL 11 10 1 101

DO NOT SCALE DRAWING		ORIGINAL DATE OF DRAWING	
UNLESS OTHERWISE SPECIFIED		19-4-9	
DIMENSIONS ARE IN INCHES		DRAFTSMAN	JD
TOLERANCES ON DECIMALS = .004		ENGR	ENGR
FRACTIONS = 1/64 ANGLES = 1/2°		ENGR	ENGR
MECHANICAL PROPERTIES		APPLICATION	
YP		TEMP. ON	
TS			
EL2			
EP			
UT			
UT			

NOTES:

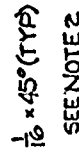
- [illegible]

ITEM NO.	QTY. REQ.	CODE IDENT. NO.	PART NO.	DESCRIPTION	C-10	CARBIDE
3	1		11831366-3	INSERT		
2	1		11831366-2	HOLDER		WISQ12455 TOOL 5"
1	1		11831366-1	MIDDLE DIE		
						SPECIFICATION WATER 21

[illegible]

DESCRIPTION	DATE	APPROVAL
-------------	------	----------

1- SPEC MIL -A-2550 APPLIES  
2- INSERT TO BE .006 TO .008 SHRINK FIT  
IN HOLDER AND FLUSH WITH HOLDER  
3- FINISH <sup>22</sup>✓ UNLESS NOTED



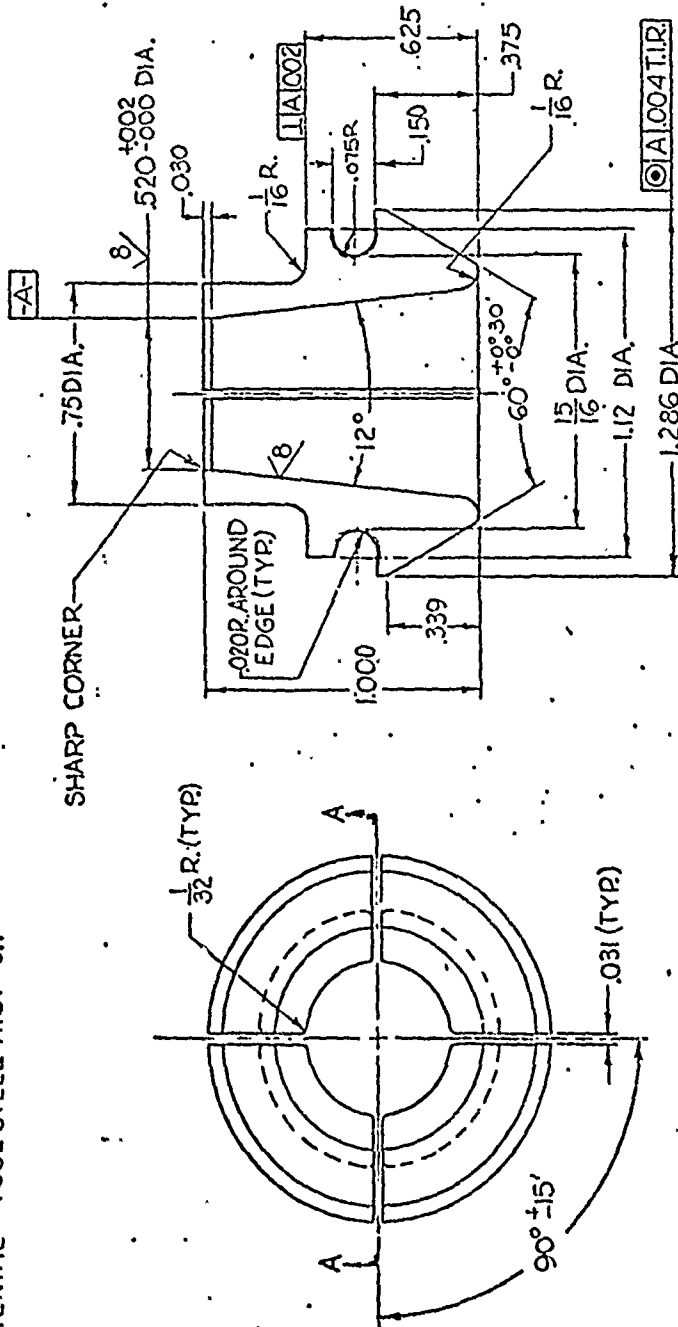
3	1	11831367-3	INSERT	C-10	CARBIDE
2	1	11831367-2	HOLDER	415101R425-50	TOOL STL.
1	1	11831367-1	TOP DIE		
ITEM	QTY.	CODE IDENT.	DESCRIPTION	SPECIFICATION	MATERIAL
	REQ.	NO.			

## PARTS LIST

PART NO. 11831367		U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		7.62 MM CARTRIDGE CASE TOP DIE SECOND DRAW	
MECHANICAL PROPERTIES		ORIGINAL DATE OF DRAWING 79-4-9		DRAFTSMAN JD	
		CHECKER L. J. 79-0-10		ENGR	
DO NOT SCALE DRAWING* UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES ON DECIMALS $\pm .004$ FRACTIONS $\pm 1/32$ ANGLES $\pm 1/2^\circ$		ENGR	
YP					
TS					
UT					
FA					
E1					
R1					
MAT MAT				C 19200 T 11831367	
USED BY					

NOTES:

1. SPEC MIL-A-2550 APPLIES.
2. DIAMETER DIMENSIONS APPLY BEFORE PART IS CUT INTO SEGMENTS.
3.  $32/H$  EXCEPT AS NOTED.
4. ROCKWELL HARDNESS C61-65
5. MATERIAL - TOOL STEEL AISI-O1



SECTION A-A

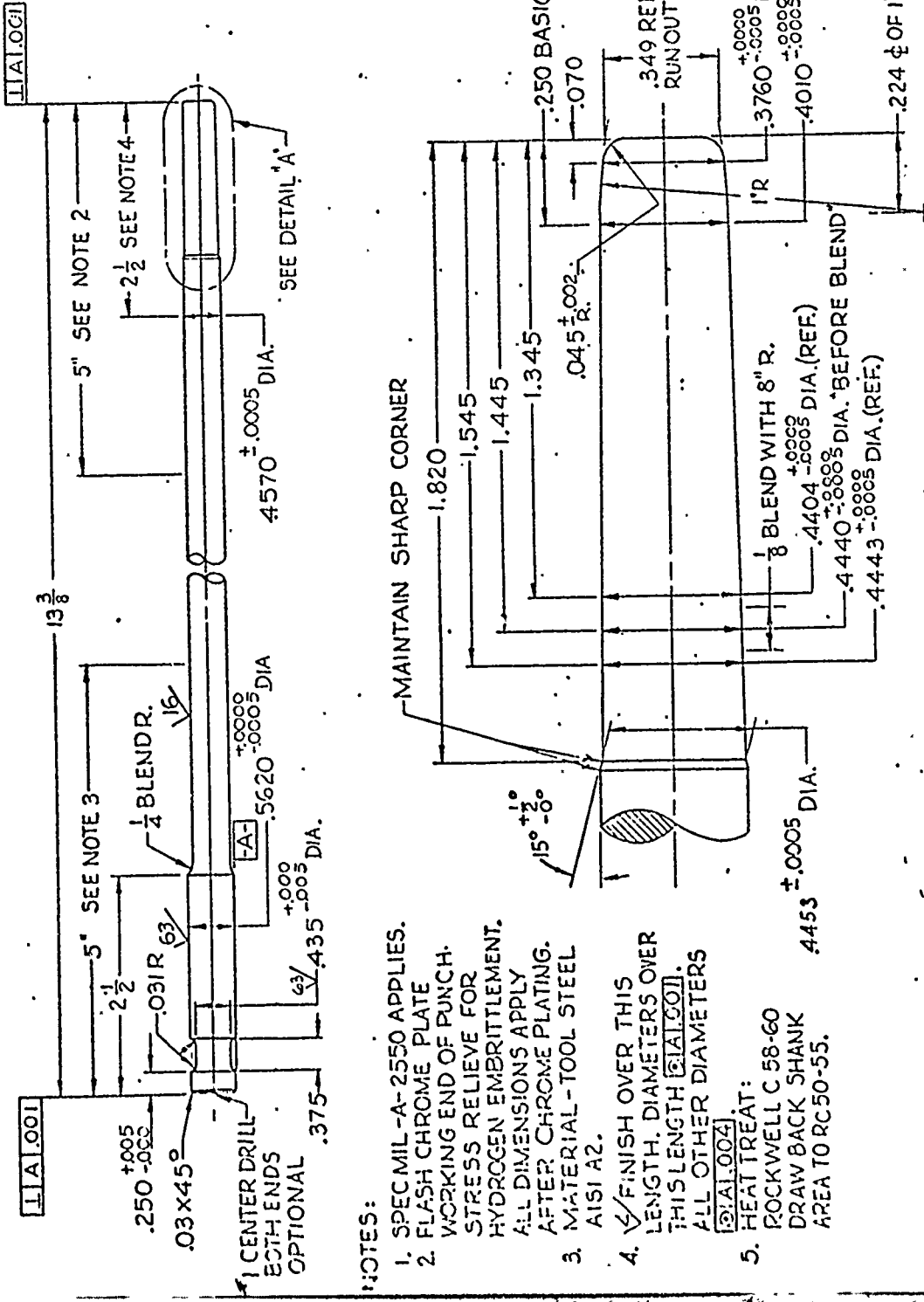
PART NO. 11831368

SYN		REVISIONS		DATE	APPROVAL
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07301					
7.62 MM CARTRIDGE CASE STRIPPER SEGMENT SECOND DRAW		STC		C	19200
C		19200		T	11831368
ORIGINAL DATE OF DRAWING 79-4-7		CHECKER 124		DRAFTSMAN 124	
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES OF DECIMALS = .004 FRACTIONS = 1/4 ANGLES = 1/2		MECHANICAL PROPERTIES	
				Y2	
				T5	
				T12	
				T4	
				T11	
				T13	
NEXT ASSY		USED ON		APPLICATION	





SYM	DESCRIPTION	DATE	APPROVAL



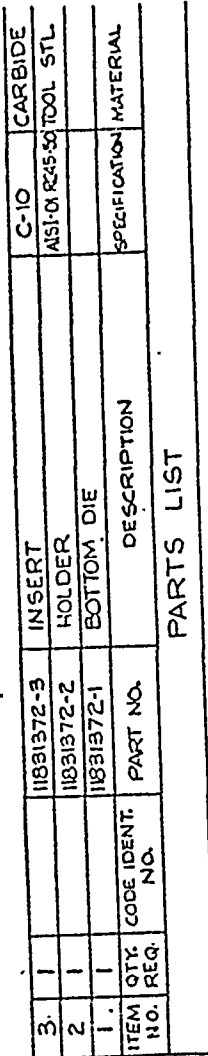
- NOTES:
1. SPEC MIL-A-2550 APPLIES.
  2. FLASH CHROME PLATE WORKING END OF PUNCH. STRESS RELIEVE FOR HYDROGEN EMBRITTLEMENT. ALL DIMENSIONS APPLY AFTER CHROME PLATING.
  3. MATERIAL - TOOL STEEL AISI A2.
  4.  $\sqrt{}$  FINISH OVER THIS LENGTH. DIAMETERS OVER THIS LENGTH [3:1A1.001]. ALL OTHER DIAMETERS [3:1A1.004].
  5. HEAT TREAT: ROCKWELL C 58-60 DRAW BACK SHANK AREA TO RC50-55.

DETAIL "A"  
SCALE 4:1

PART NO. 11831371

U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		ORIGINAL DATE OF DRAWING 79-4-11	DRAFTSMAN ACH	CHECKER 2.7 79-4-11
7.62 MM CARTRIDGE CASE PUNCH		ENGINEER ENGR	ENGINEER ENGR	ENGINEER ENGR
FINAL DRAW		SIZE C	COO IDENT NO 19200	DATE T 11831371

REVISIONS		
SYM	DESCRIPTION	DATE



## PARTS LIST

PART NO. 11831372

ART NO. 1100  
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER NEW JERSEY 07801

7. 62 MM CARTRIDGE CASE  
BOTTOM DIE  
FINN DRAW

SIZE C	CODE IDENT NO. 19200	T	11831372
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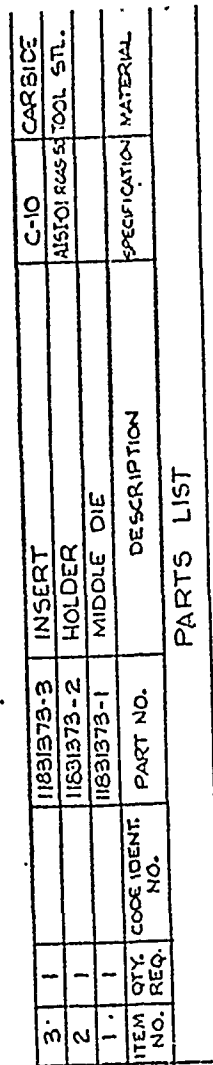
DATE	201	UNIT	VI
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137025

MECHANICAL PROPERTIES		UNIT	TEST METHOD
Yield Strength	Y <sub>P</sub>		
Tensile Strength	T <sub>S</sub>		
Elongation	E <sub>L</sub>		
Reduction of Area	R <sub>A</sub>		
Impact Strength	D <sub>H</sub>		
Hardness	H <sub>V</sub>		

## APPLICATION

NOTES:  
1- SPEC. MIL-A-2550 APPUES  
2- INSERT TO BE .006 TO .008 SHRINK FIT  
IN HOLDER AND FLUSH WITH HOLDER  
3- FINISH <sup>25</sup>/ UNLESS NOTED



PART NO. 11831373

ART NO. 11030  
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

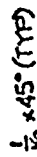
7.62 MM CARTRIDGE CASE  
MIDDLE DIE  
FBI LAB

DATE	COOLING NO	1	11-21-73
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[illegible]

335.

- 3-FINISH  $\frac{32}{33}$  UNLESS NOTED



## PARTS LIST

PAET NO. 11831374

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

7.62 MM CARTRIDGE CASE

TOP DIE

ON 14/01/2011 17:52

19

i

115. 1137.3

100

## NOTATION

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in  
tu  
t-  
(

Spec M1-A-2550 APPLIES

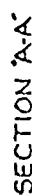
DATE: \_\_\_\_\_ DAY: \_\_\_\_\_

## CUT INTO SEGMENTS

32/EXCEPT AS NOTED

ROCKWELL HARDNESS C61-65

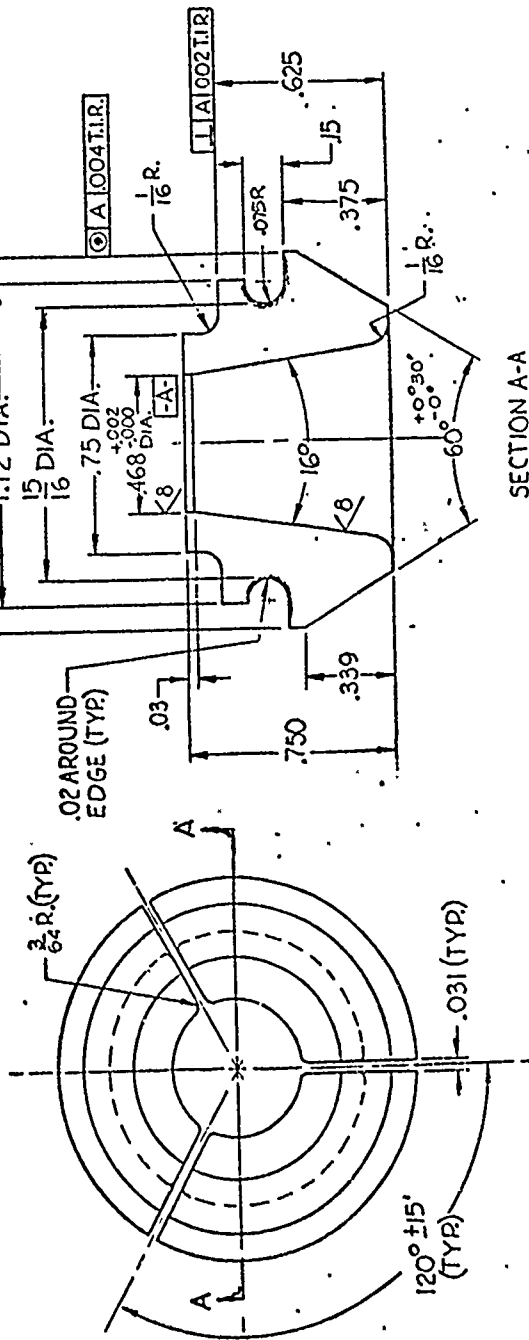
MATERIAL-TOOL STEEL AISI O-1



PART NO. 11861375		U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		ORIGINAL DATE OF DRAWING 79-4-9	
VP	DRAFTSMAN L.A.T.	CHECKER J.J.	79-4-16
TS	ENGR	ENGR	
EL2			
RA	ENGR	ENGR	
CH			
1-1			
TOLERANCES ON DECIMALS $\pm .004$ FRACTIONS $\pm \frac{1}{16}$ ANGLES $\pm \frac{1}{2}^\circ$		762 MM CARTRIDGE CASE STRIPPER SEGMENT FINAL DRAW	
MECHANICAL PROPERTIES		SIZE CODE IDENT NO	
		C 19200 T 11861375	
DATE REV		REV	
UFCO GR		11861375	
AJ146-APP-11			

NOTES:

1. SPEC MIL-A-2550 APPLIES.
2.  $\frac{3}{32}$  EXCEPT AS NOTED.
3. ROCKWELL HARDNESS C61-65.
4. DIAMETER DIMENSIONS APPLY BEFORE PART IS CUT INTO SEGMENTS.
5. MATERIAL - TOOL STEEL AISI O-1.



SECTION A-A

PART NO. 11831376

ORIGINAL DATE OF DRAWING		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND	
79-4-12		DOVER, NEW JERSEY 07101	
DRAFTSMAN	CHECHS	7.62 MM CARTRIDGE CASE	
ENGR	ENGR	STRIPPER SEGMENTS	
ENGR	ENGR	FINAL DRAW	
DO NOT SCALE DRAWING		UNLESS OTHERWISE SPECIFIED	
DIMENSIONS ARE IN INCHES		TOLERANCES ON DECIMALS ± .004	
FRACTIONS ± 1/16 ANGLES ± 1/2°		MECHANICAL PROPERTIES	
		YP	
		TS	
		EL	
		RA	
		GH	
		WT	
APPROVAL		SIZE	
		C 19200	
		T 11831376	

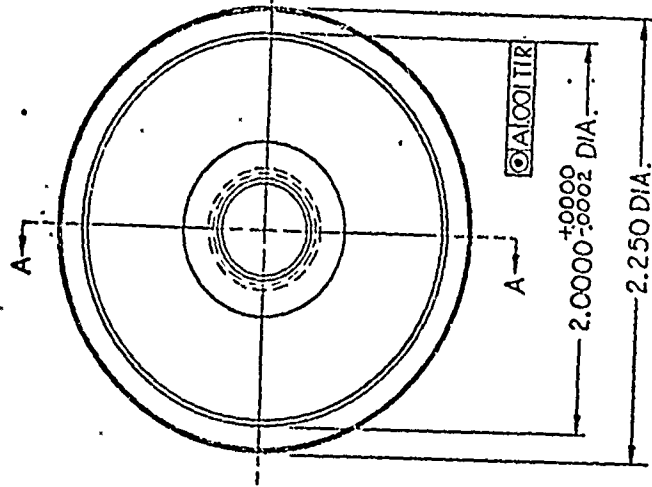




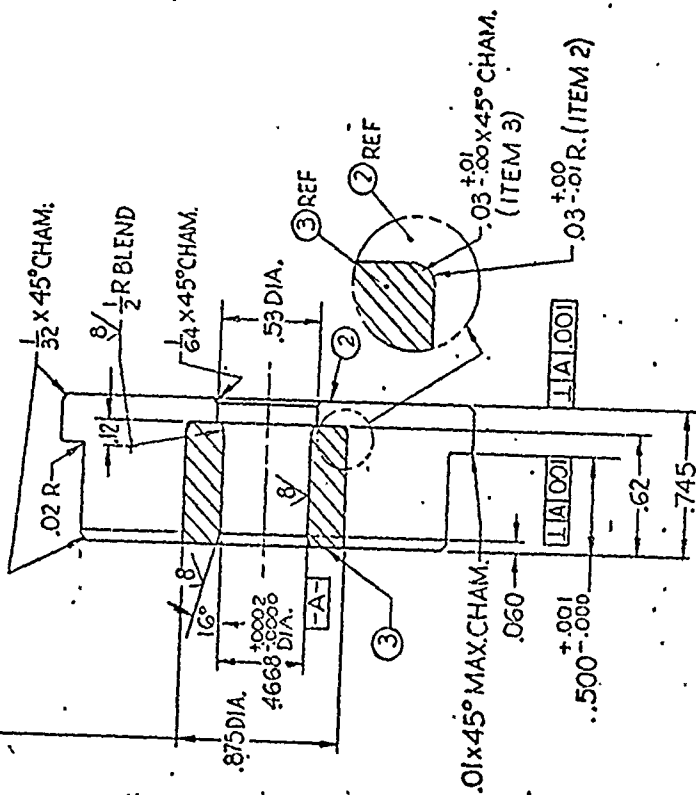


# NOTES:

1. SPEC. MIL-A-2550 APPLIES.
2. HEAT TREAT - AIR COOL FROM 1825°F. DOUBLE DRAW TO 1100°F. 3 ± 3 HOURS TO RC 50-52.
3. ☒ FINISH UNLESS NOTED.



.004 INTERFERENCE FIT. DO NOT HEAT ABOVE 1100°F FOR SHRINK FITTING.



SECTION A-A

7.62 mm?

ITEM NO.	QTY. REQ.	CODE IDENT. NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
3	1		11831380-3	INSERT	SEE NOTE 2	C13 CARBIDE
2	1		11831380-2	HOUSING		H-11 OX-H-13 TOOL STEEL
1	1		11831380-1	POCKET & HEAD DIE		

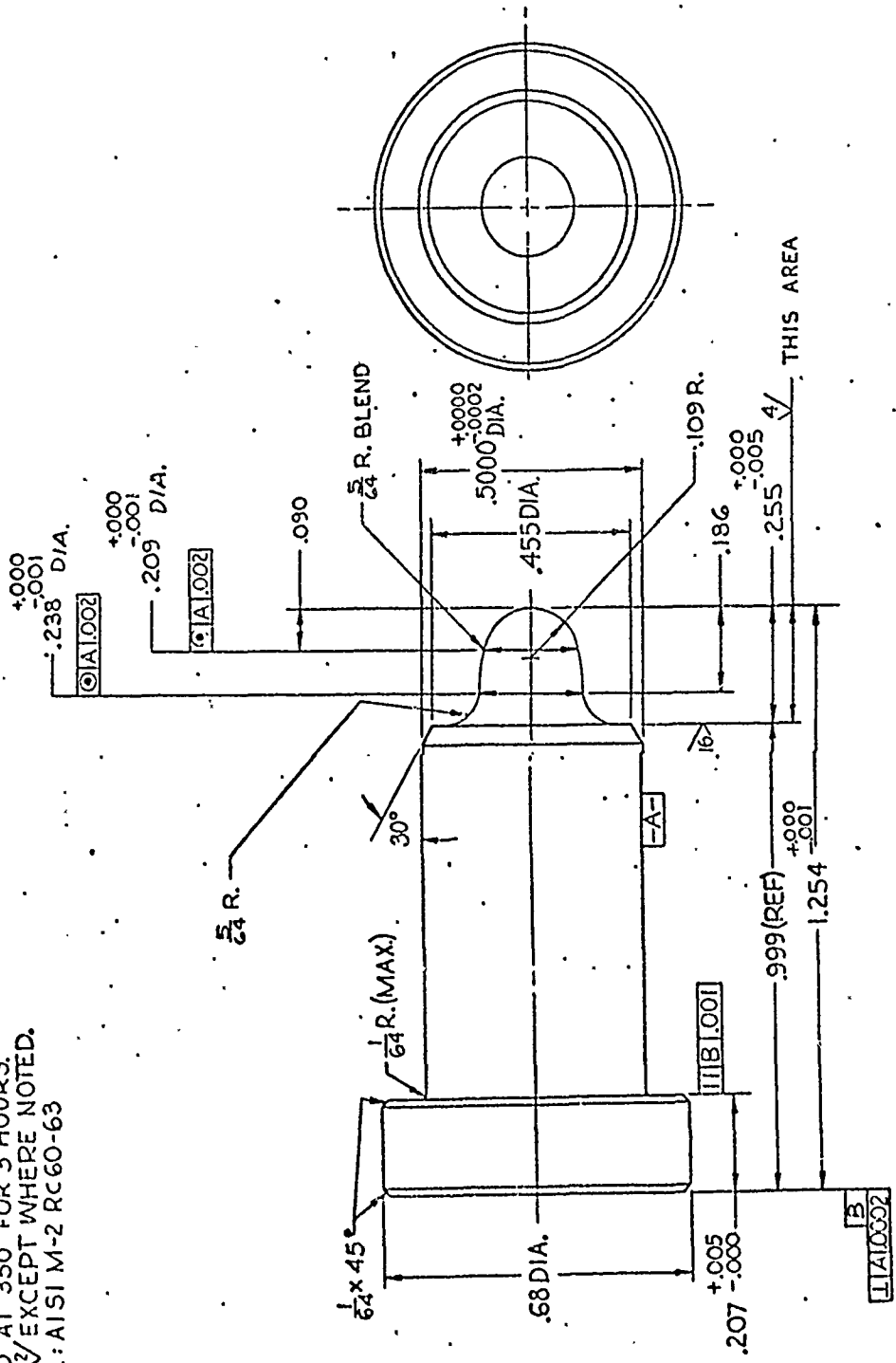
## PARTS LIST

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		ORIGINAL DATE OF DRAWING 79-4-24		PART NO. 11831360	
TOLERANCES ON DECIMALS ± .004 FRACTIONS ± 1/32 ANGLES ± 1/2°		DRAWN BY: JCH		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
CHECKED BY: [ ]		ENG'G BY: [ ]		7.62 MM CARTRIDGE CASE POCKET & HEAD DIE	
MATERIAL BY: [ ]		L'NGR BY: [ ]		SIZE CODE IDENT. NO. C 19200 T 11831360	
MECHANICAL PROPERTIES		ATTENTION			
Y.P.					
T.S.					
E.L.					
R.A.					
D.H.					
H					

SYM	DESCRIPTION	DATE	APPROVAL

NOTES:

1. SPEC. MIL-A-2550 APPLIES.
2. PUNCHES MADE BY EDM MUST BE RELIEVED AT 350° FOR 3 HOURS.
3. FINISH  $\sqrt{32}$  EXCEPT WHERE NOTED.
4. MATERIAL: AISI M-2 RC60-63



PART NO. 11831381

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
7.62 MM CARTRIDGE CASE POCKET ENTER	
SIZE C	CODE IDENT NO 19200
T 11831381	

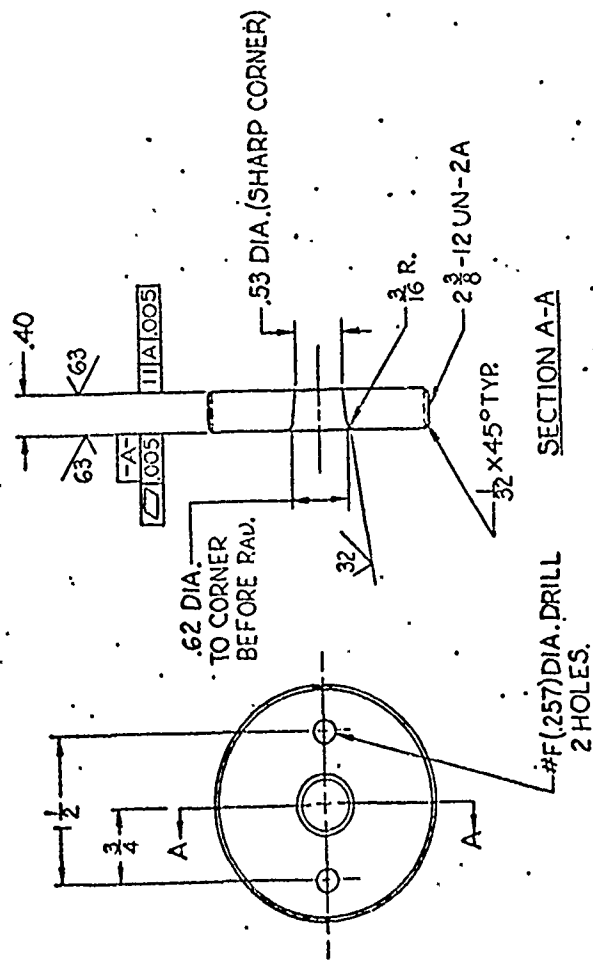
ORIGINAL DATE OF DRAWING 79-4-24	
DRAFTSMAN ACH	CHECKER ENGR
ENGR	ENGR

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS $\pm .005$ FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$	
MECHANICAL PROPERTIES	
YP	
TS	
EL2	
RA	
DI	
PH	

DATE ASSY	DATE CHG	DATE APPROV

NOTES:

1. SPEC MIL-A-2550 APPLIES.
2. MATERIAL: STEEL 4340.
3. HEAT TREAT TO RC 38-42.



PART NO. 11831382

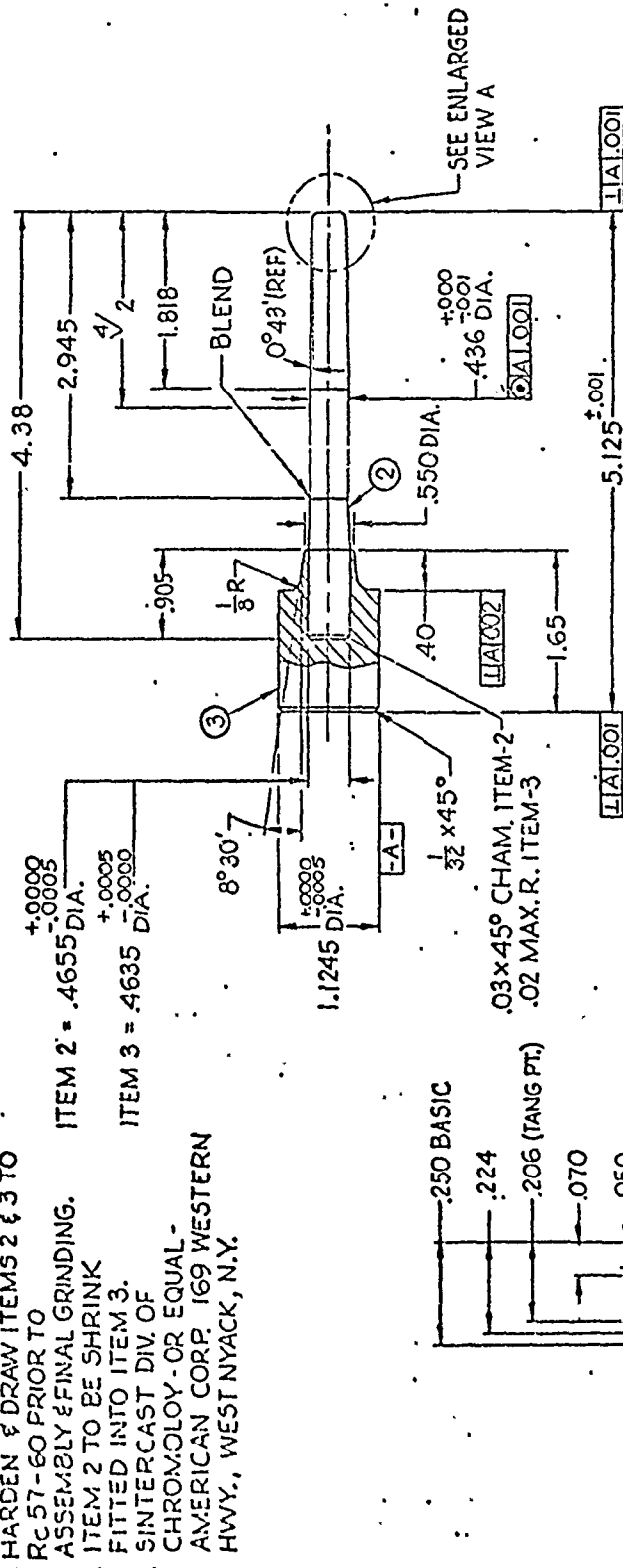
ORIGINAL DATE OF DRAWING 79-4-30		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
DRAFTSMAN ACH	CHECKER ENGR	7.62 MM CARTRIDGE CASE POCKET & HEAD DIE RETAINER NUT	
ENGR	ENGR	SIZE C 19200 T 11831382	
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS $\pm .004$ FRACTIONS $\pm 1/4$ ANGLES $\pm 1/2^\circ$		MECHANICAL PROPERTIES	
Y.P.	TS	R.H.	
ELC	RA	R.H.	
BH	PH	R.H.	
NEXT ASSY		USED ON	
REVISIONS		DATE	
SYN		APPROVAL	

REVISIONS			DATE	APPROVAL
SYM	DESCRIPTION			

51-02

1. SPEC MIL-A-2550 APPLIES.
2. FINISH  $\frac{32}{3}$  ALL SURFACES UNLESS OTHERWISE NOTED.
3. HARDEN & DRAW ITEMS 2 & 3 TO RC 57-60 PRIOR TO ASSEMBLY & FINAL GRINDING.
4. ITEM 2 TO BE SHRINK FITTED INTO ITEM 3.
5. SINTERCAST DIV. OF CHROMOLLOY-OR EQUAL - AMERICAN CORP. 169 WESTERN HWY., WEST NYACK, N.Y.

ITEM 2 = .4655 DIA.  
ITEM 3 = .4635 DIA.



ITEM NO.	QTY. REQ.	CODE IDENT. NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
3	1		11831384-3	BASE	M-2	TOOL STEEL
2	1		11831384-2	STEM	GR-C <sup>52</sup>	FERRO-TIC
1	1		11831384-1	STEM ASSEMBLY		

## PARTS LIST

PART NO. 11831384

[illegible]

ENLARGED VIEW A  
SCALE - 4:1

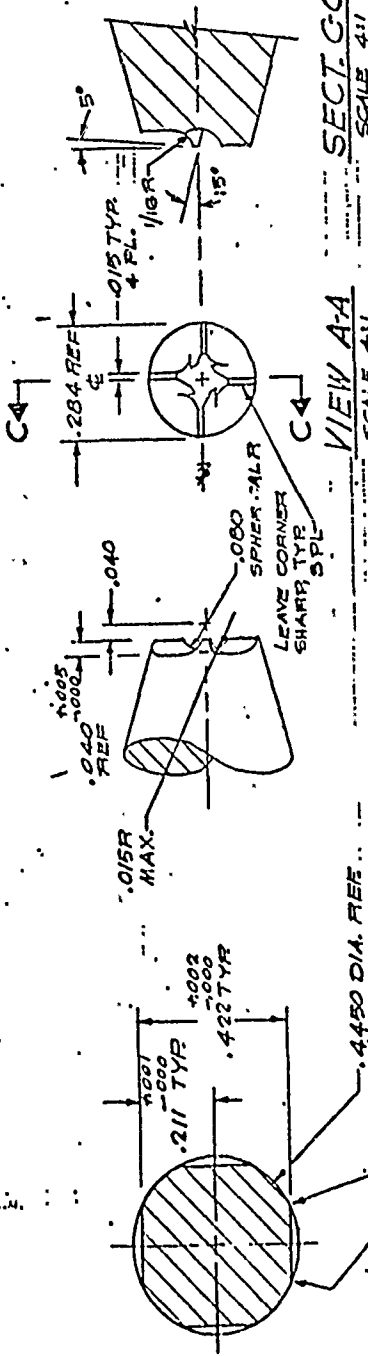
ALL DIAMETERS  
IN THIS VIEW

QIA 1.001



SYM	DESCRIPTION	DATE	APPROVE
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32/ALL OVER.

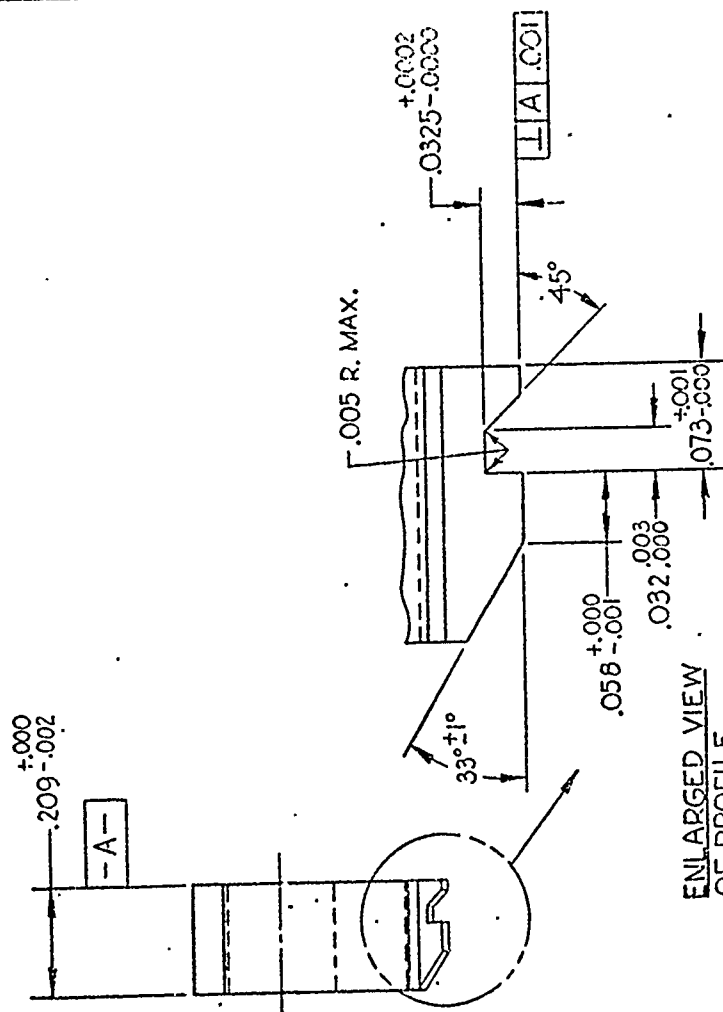


SIZE C	CODE IDENT NO 19200	T	11831387
SCALE 3:1		SHEET	

SECTION B-B  
SCALE 4:1

1. SPEC. MIL-A-2550 APPLIES.

- [illegible]



ENLARGED VIEW  
OF PROFILE

8/ENTIRE PROFILE, DO NOT BREAK SHARP EDGES.

PART NO. 11831471

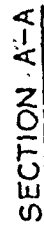
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		7.62 MM CARTRIDGE CASE FORMING TOOL HEAD TURN		T 11831388	
ORIGINAL DATE OF DRAWING 80-12-10		CHECKER <i>ACH</i> P-0112-12		SCALE 4 : 1	
DRAFTSMAN <i>ACH</i>		ENGR		UNIT WT	
ENGR		ENGR		SHEET	
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED • DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS $\pm .01$ $\pm .0004$ FRACTIONS $\pm 1/64$ ANGLES $\pm 1/2^\circ$		SIZE B		CODE IDENT NO 19200	
MECHANICAL PROPERTIES		LHGR		T 11831388	
YP					
TS					
EL2					
RA					
BH					
RH					
NEXT ASSY		USED ON			
APPLICATION					

NOTES:  
1 SPEC MIL-A-2550 APPLIES.

2. 12<sup>15</sup>/FINISH UNLESS NOTED.

4. MATERIAL: STEEL AISI 4130

RC 34-38.



PART NO. 11831382

PART NO. 1101002  
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

7.62MM CARTRIDGE CASE  
STRIPPER BLOCK  
HEAD TURN

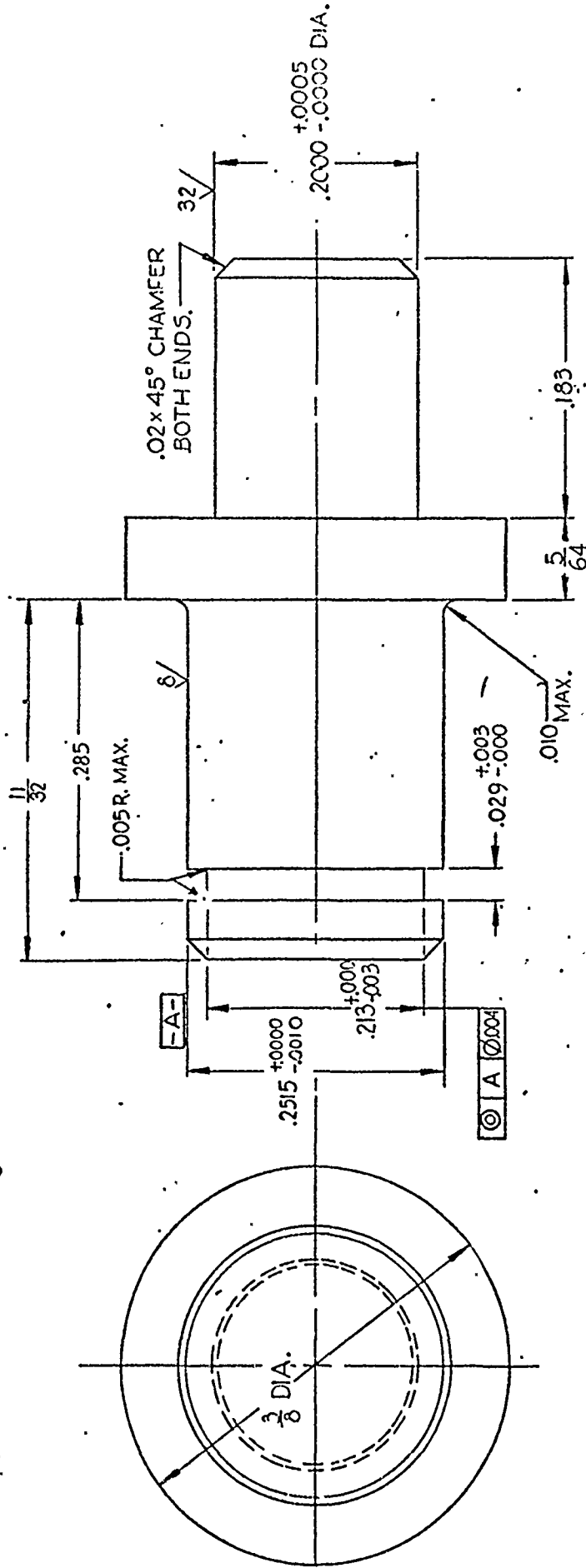
DATE	00000000	11231589
GOOD IDENT NO		

00761	2
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NOTES:

1. SPEC. MIL-A-2550 APPLIES.
2. 125/ FINISH UNLESS NOTED.
3. MATERIAL, TOOL STEEL AISI O1 RQ 55-58

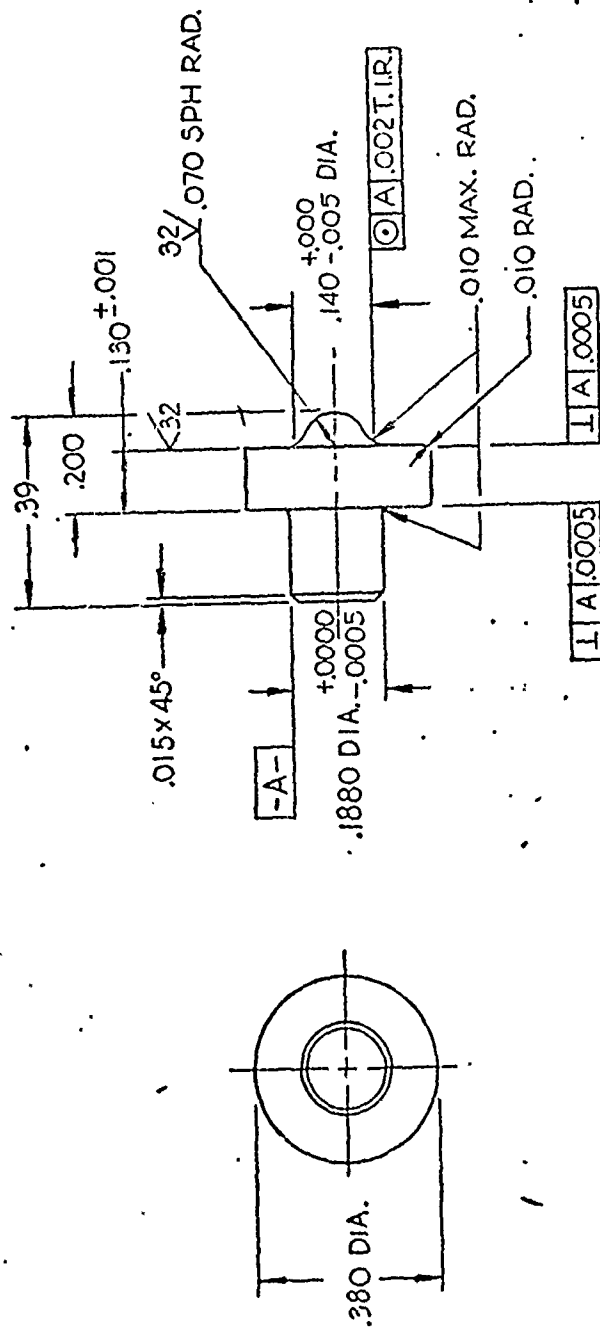


PART NO. 11831474

ORIGINAL DATE OF DRAWING 80-12-11		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		MECHANICAL PROPERTIES		APPLICATION	
DRAFTSMAN ACH	CHECKER 227	TOLERANCES ON DECIMALS $\pm$ .01		YP	USED ON NEXT ASSY	1:1-2	
ENGR	ENGR	FRACTIONS $\pm \frac{1}{64}$ ANGLES $\pm \frac{1}{2}^\circ$		TS			
ENGR	ENGR			EL2			
ENGR	ENGR			RA			
ENGR	ENGR			BH			
U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		7.62MM CARTRIDGE CASE HEAD TURN ROLLER PIN		CODE IDENT NO B 19200		T-11831390	
SCALE 10:1		UNIT WT		SHEET			

NOTES:

1. SPEC. MIL-A-2550 APPLIES.
2.  $32\sqrt{\phantom{x}}$  FINISH ALL OVER.
3. MATERIAL: TOOL STEEL AISI 52, RC52-56.



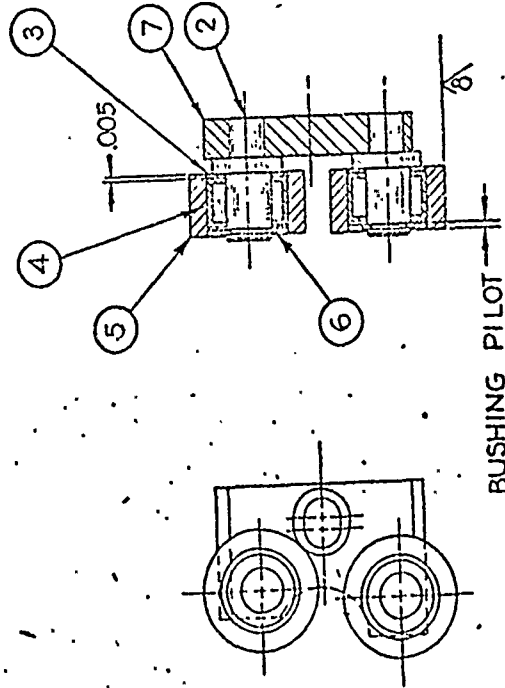
PART NO. 11831475

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		ORIGINAL DATE OF DRAWING 80-12-11		DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		MECHANICAL PROPERTIES		APPLICATION	
7.62 MM CARTRIDGE CASE PLUG HEAD TURN		DRAFTSMAN ACH CHECKER 247 RC-12-15		TOLERANCES ON DECIMALS $\pm .010$ TO $\pm .004$ FRACTIONS $\pm \frac{1}{64}$ ANGLES $\pm \frac{1}{2}^\circ$		YP TS EL2 RA BH RH		USED ON APPLICATION	
SIZE B	CODE IDENT NO. 19200	ENGR ENGR		ENGR ENGR		NEXT ASSY USED ON		SHEET T-11831391	
REVISIONS		DESCRIPTION		DATE		APPROVAL			



# NOTES:

- SPEC. MIL-A-2550 APPLIES.
- ASSEMBLE GROUND DRILL BUSHING & NEEDLE BEARING AS SHOWN WITH PILOT END OF BUSHING AT RETAINING RING OF ROLLER PIN.
- POLISH O.D. OF DRILL BUSHING & BREAK SHARP CORNER  $\nabla$  TO  $\nabla$ .
- ORDER FROM: CARR-LANE MFG.CO., ST. LOUIS, MO. 63119.
- ORDER FROM: McMASTER-CARR SUPPLY CO., P.O. BOX 4355, CHICAGO, ILL. 60680.
- ORDER FROM: THE TORRINGTON CO. TORRINGTON, CONN. 06790.
- ORDER FROM: WALDES-KOHINOOR, INC 47-16 AUSTEL PLACE, LONG ISLAND CITY, N.Y. 11101.



ITEM NO.	QTY	CODE IDENT. NO.	PART NO.	DESCRIPTION	SPEC.	MATERIAL
1	1		11831473	SLIDE GUIDE HOLDER		
2	2		11831472-6	RETAINING RING - E-RING #5133-25 W/LDES TRJARC		SEE NOTE 7
3	2		11831472-5	DRILL BUSHING - P-40-5.7800 x 1/8 ID. x 1/16 LG.		SEE NOTE 4
4	2		11831472-4	NEEDLE BEARING #B44		SEE NOTE 6
5	4		11831472-3	NYLON WASHER #95206A11 3/8 OD x 1/4 ID. x .054		SEE NOTE 5
6	2		11831474	ROLLER PIN		
7	1		11831472-1	GUIDE ROLLER ASSY.		
PARTS LIST						

SEE SEPARATE PARTS LIST 11831472

ORIGINAL DATE OF DRAWING  
80-12-11

PART NO. 11831472  
U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

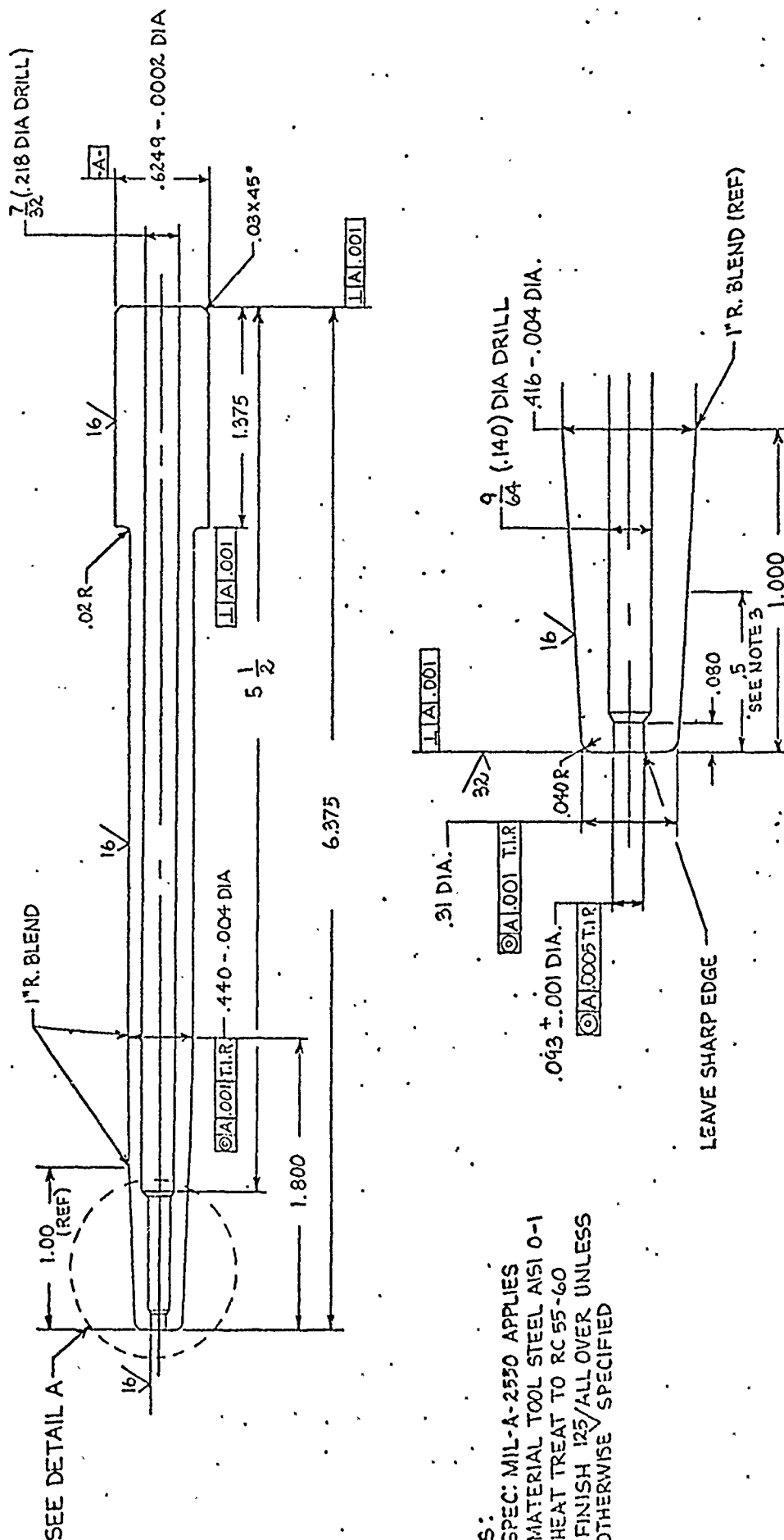
DO NOT SCALE DRAWING		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES ON DECIMALS .004		TOLERANCES ON ANGLES .004	
MECHANICAL PROPERTIES		YR		TS		EL2	
		RA		DH		RH	
NEXT ASSY		USED ON		APPLICATION			
SIZE		CODE IDENT NO		SCALE 2:1		UNIT WT	
C		19200		T-11831393		SHEET	

7.62 MM CARTRIDGE CASE  
GUIDE ROLLER ASSEMBLY  
HEAD TURN

[illegible]



SYM	DESCRIPTION	DATE	APPROVAL
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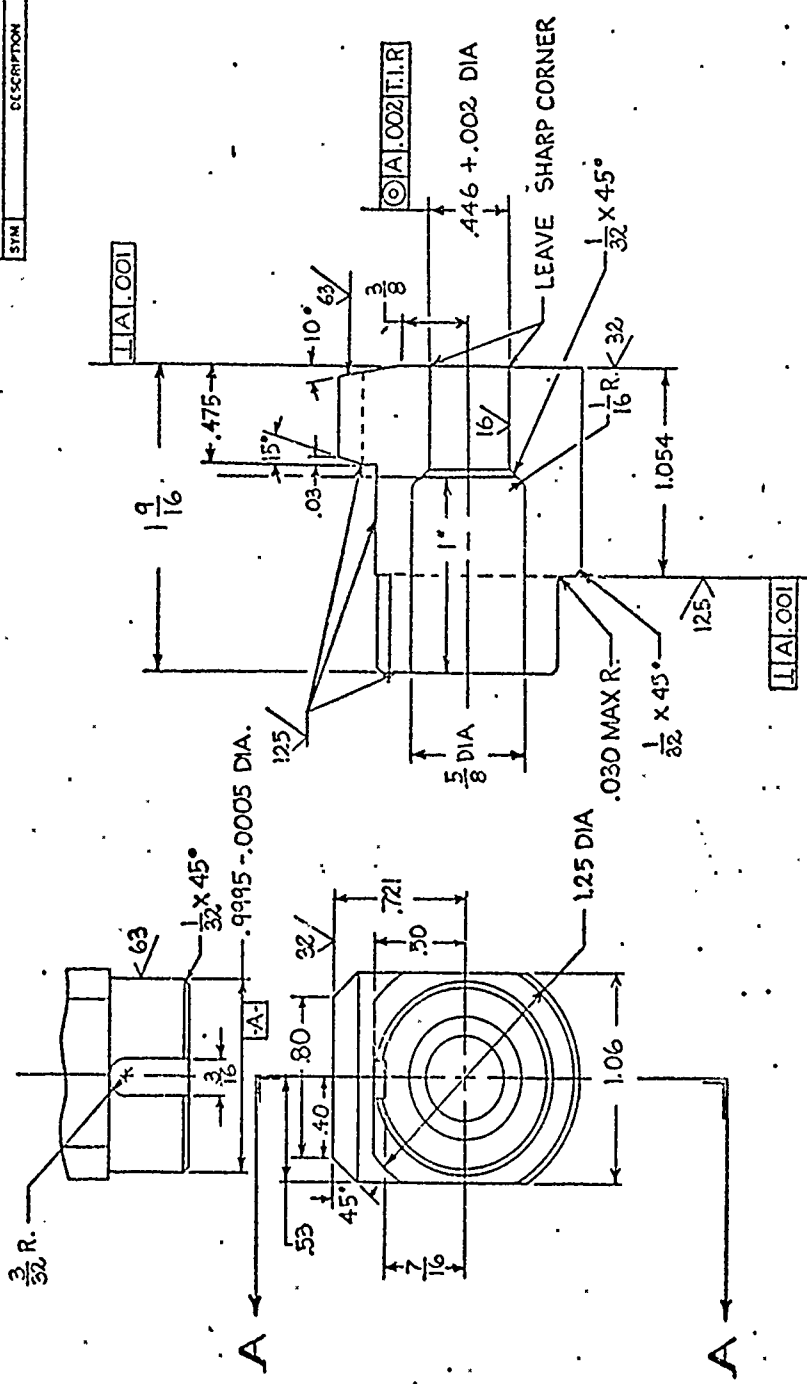


- NOTES:
1. SPEC: MIL-A-2550 APPLIES
  2. MATERIAL TOOL STEEL AISI O-1
  3. HEAT TREAT TO RC 55-60
  4. FINISH 125/ALL OVER UNLESS OTHERWISE SPECIFIED

DETAIL A  
SCALE: 4:1

PART NO. 11831397		U.S. ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
ORIGINAL DATE OF DRAWING 79-7-30	CHECKER ENGR	DESIGNER ENGR	ENGR
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS ± .004 FRACTIONS ± 1/16 ANGLES ± 1/2°			
MECHANICAL PROPERTIES			
Y.P.	7522 MPA		
T.S.	7522 MPA		
EL	7522 MPA		
HA	7522 MPA		
UH	7522 MPA		
HH	7522 MPA		
NEAT ASY	USED ON		
APPROVED BY			
C 19200		T 11831397	

SYM	DESCRIPTION	DATE	APPROVAL
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- NOTES:
1. SPEC: MIL-A-2550 APPLIES
  2. MATERIAL: STEEL AISI 4130
  3. HEAT TREAT TO RC 34-38

SECTION A-A

PART NO. 11831398

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

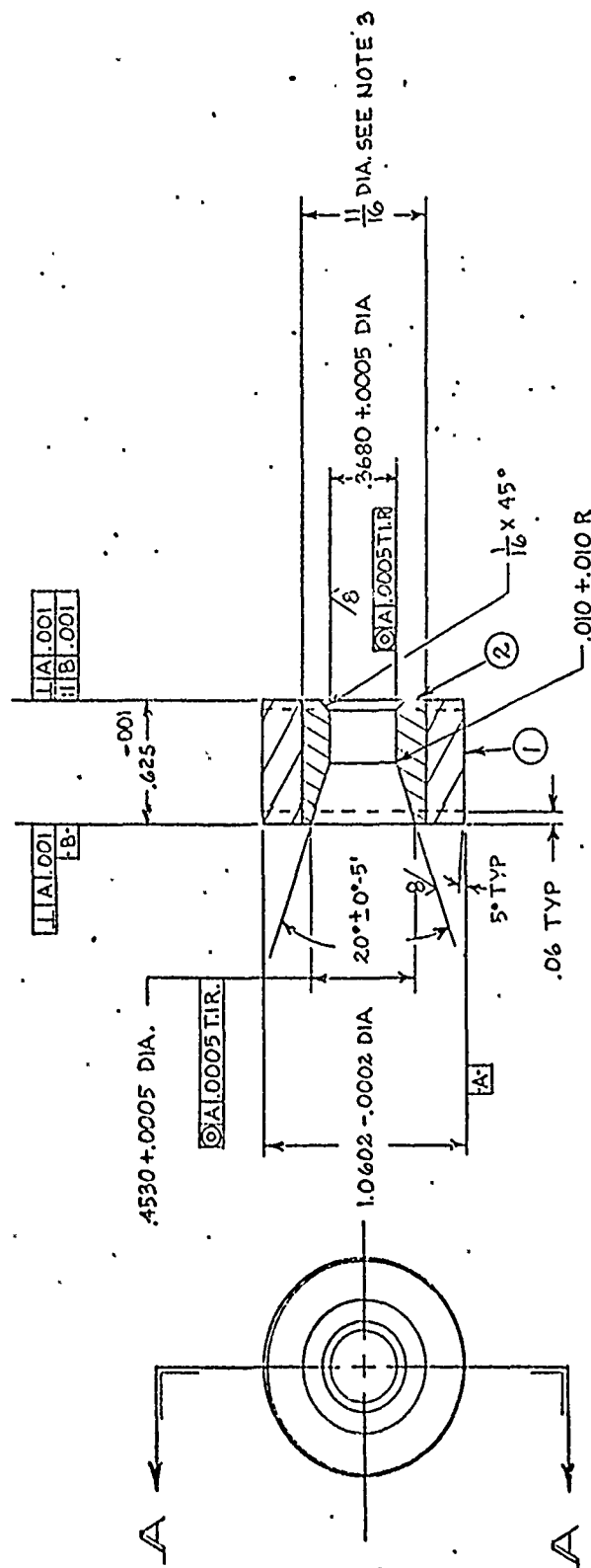
STRIPPER  
PIERCE

SIZE	CODE IDENT NO	T	11831398
C	19200		

DO NOT SCALE DRAWING		ORIGINAL DATE OF DRAWING	
UNLESS OTHERWISE SPECIFIED		79-7-26	
DIMENSIONS ARE IN INCHES		DRAFTSMAN	CHECKER
TOLERANCES ON DIMENSIONS ARE		ENGR	ENGR
FRACTIONS ON DIMENSIONS ARE		ENGR	ENGR
ANGLES ARE			
FRACTIONS ON ANGLES ARE			
MECHANICAL PROPERTIES			
YR			
TS			
EL2			
RA			
OH			
PH			
APPLICATION			
MEAT ASSY	USED ON		







## SECTION A-A

- NOTES:
1. SPEC: MIL-A-2550 APPLIES
  2. MATERIAL - STEEL 4130
  3. CARBIDE C-10 INSERT TO BE .002 TO .004 SHRINK FIT IN HOLDER AND TO BE FLUSH WITH HOLDER.
  4. HEAT TREAT TO RC 35-45
  5. FINISH  $32\sqrt{}$  ALL OVER UNLESS OTHERWISE NOTED

ITEM NO.	QTY REQ	CODE IDENT NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
2			11831401-2	CARBIDE INSERT	11/16 DIA X 5/8	CARBIDE C-10
1			11531401-1	HOLDER	1 1/4 DIA X 3/8	SEE NOTE 2

PARTS LIST

## PARTS LIST

## PART NO. 11831401

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
FOYER, NEW JERSEY 07061

SHOULDER DIE  
FIRST TAPER

206	C	CONFIDENT NO	1	1102-1401
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[illegible]

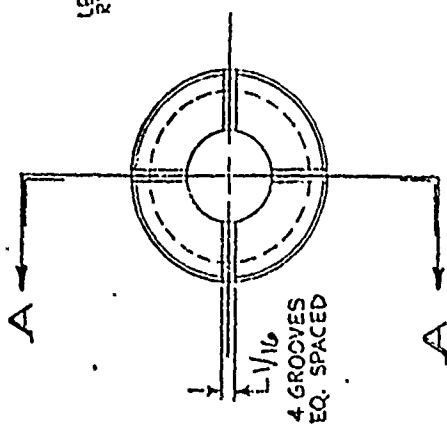


1. SPEC: MIL-A-2550 APPLIES
2. MATERIAL TOOL STEEL AISI-O2
3. HEAT TREAT TO RC 55-60
4. FINISH 43/ALL OVER UNLESS OTHERWISE SPECIFIED

PART NO. 11831402

				MECHANICAL PROPERTIES		DO NOT SCALE DRAWING		ORIGINAL DATE OF DRAWING		U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801					
				YP		UNLESS OTHERWISE SPECIFIED		79-7-30		<div>MANDREL FIRST TAPER</div> <div>CODE IDENT NO. B 19200</div> <div>T 11831402</div>					
				TS		DIMENSIONS ARE IN INCHES		DRAFTSMAN MBE						CHECKER	
				EL2		TOLERANCES ON DECIMALS = .004		ENGR						ENGR	
				RA		FRACTIONS = 1/64 ANGLES = 1/2°		ENGR						ENGR	
												SIZE			
				BH								B			
												T			
				RH								11831402			
												SCALE 2:1			
												UNIT WT. .03			
												SHEET			
NEXT ASSY															
APPLICATION															

WAS	DESCRIPTION	DATE	AMOUNT
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## SECTION A-A

- NOTES

ITEM NO.	QTY REQ	CODE IDENT NO.	PART NO.	DESCRIPTION	SPECIFICATION	MATERIAL
2			11831403-2	CARBIDE INSERT	21/32 DIA X 1 1/2	CARBIDE CHIPS
1			11831403-1	DIE HOLDER	11/16 DIA X 1 1/2	SEE NOTE 2

PARTS 115T

# PARTS LIST

PART NO. 11831403		U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801	
ORIGINAL DATE OF DRAWING 79-8-14		BODY DIE SECOND TAPER	
DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON DECIMALS = .0004 FRACTIONS = 1/64 ANGLES = 1/2°		DRAFTSMAN ENGR ENGR	
MECHANICAL PROPERTIES		CHECKER ENGR	
YP			
TS			
EL2			
PA			
CL			
RM			
HEAT TREAT	WTD ON	SIZE C	
		CODE IDENT NO 19200	
		T 11831403	

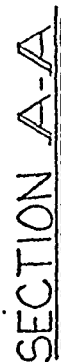
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- |          |         |                |            |                |                 |              |
|----------|---------|----------------|------------|----------------|-----------------|--------------|
| 2.       |         |                | 11831404-2 | CARBIDE INSERT | 11/16 DIA X 5/8 | CARBIDE C-12 |
| 1        | .       |                | 11831404-1 | HOLDER         | 11/16 DIA X 5/8 | SEE NOTE C   |
| ITEM NO. | QTY REQ | CODE IDENT NO. | PART NO.   | DESCRIPTION    | SPECIFICATION   | MATERIAL     |

PARTS LIST	
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PART NO. IIS31404						U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07831							
						ORIGINAL DATE OF DRAWING <b>79-8-8</b>							
						DRAWN BY ENGR				CHECKED BY ENGR			
						TOLERANCES ON DECIMALS = .004							
						FRACTIONS = 1/16 ANGLES = 1/2°							
MECHANICAL PROPERTIES													
YT													
TS													
EEL													
HA													
EH													
OH													
NEXT APP.						DATE							
NEXT APP.						DATE							



1. SPEC: MIL-A-2550 APPLIES
2. MATERIAL TOOL STEEL AISI-D2
3. HEAT TREAT TO RC 55-60
4. FINISH 63/ALL OVER UNLESS OTHERWISE NOTED

PART NO. 11831405

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND  
DOVER, NEW JERSEY 07801

MANDREL  
SECOND TAPER

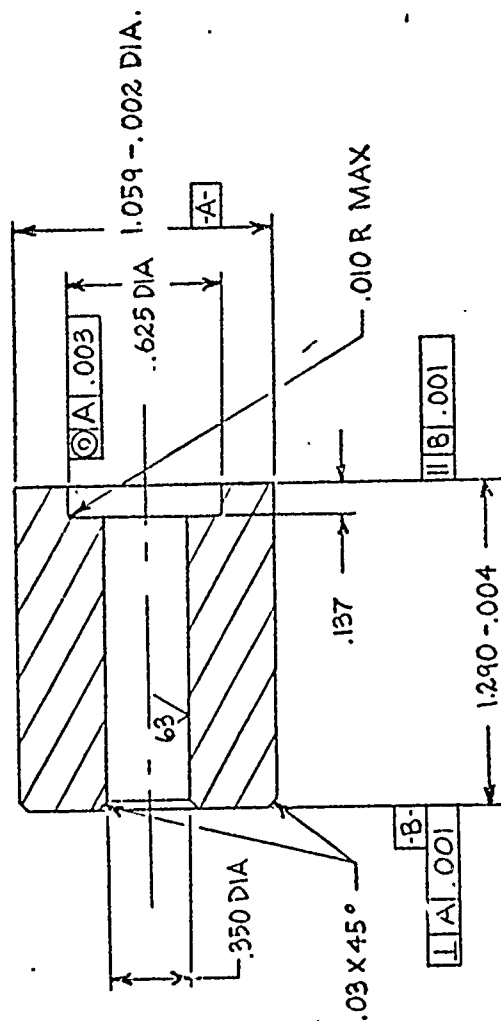
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B 19200

11831405

SCALE	2:1	UNIT YFT
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133645

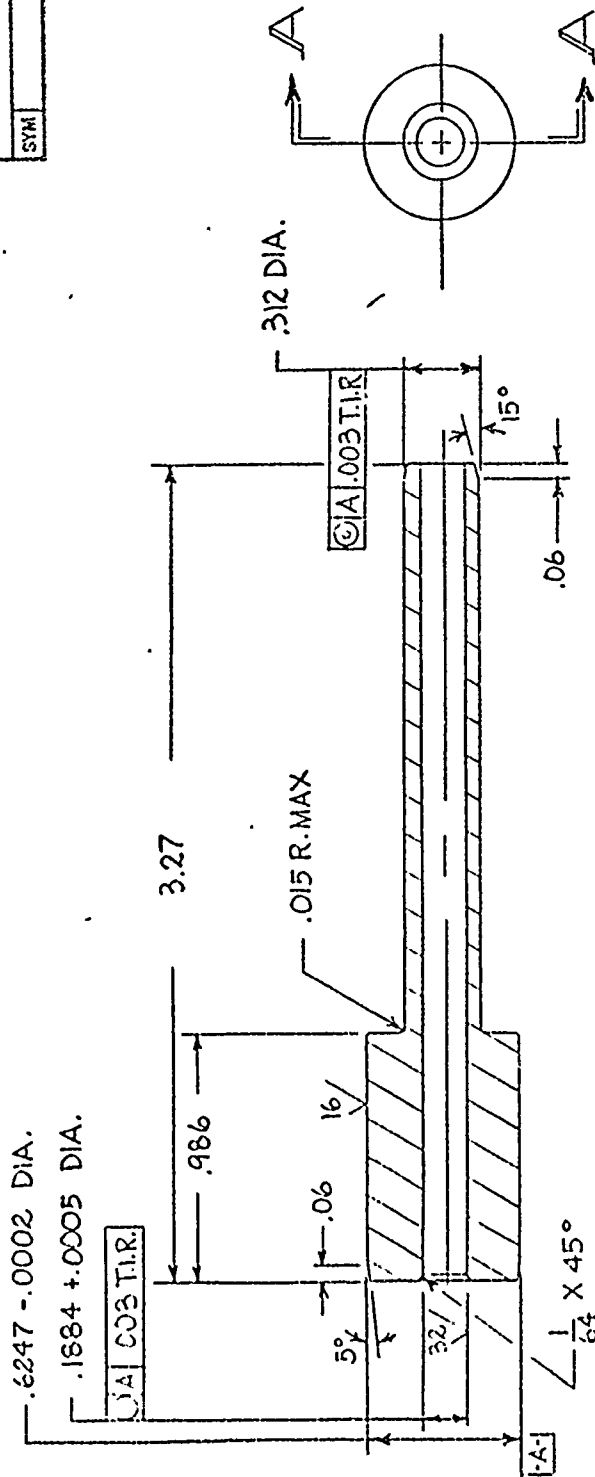


## NOTES:

- 1 SPEC: MIL-A-2550 APPLIES  
2 MATERIAL STEEL AISI 4130  
3 HEAT TREAT TO RC 35-40  
4. FINISH 32/ALL OVER UNLESS  
OTHERWISE NOTED

[illegible]

REVISIONS		
SYM	DESCRIPTION	DATE
		APPROVAL



## SECTION A-A

### NOTES:

1. SPEC: MIL-A-2550 APPLIES
2. MATERIAL: STEEL AISI 4130
3. HEAT TREAT TO RC 35-40
4. FINISH: 63/ ALL OVER UNLESS OTHERWISE SPECIFIED

PART NO. 11831407

U S ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND DOVER, NEW JERSEY 07801		ORIGINAL DATE OF DRAWING 79-8-1	
SLEEVE FIRST & SECOND TAPER		DRAFTSMAN MBE	CHECKER W.J.C.
SIZE B		ENGR	ENGR
CODE IDENT NO. 19200		ENGR	ENGR
T		11831407	
SCALE 2:1	UNIT WT. .25	SHEET	

DO NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		TOLERANCES ON DECIMALS ± .004 FRACTIONS ± 1/64 ANGLES ± 1/2°	
MECHANICAL PROPERTIES		APPLICATION	
YP	TS	762 M11 CARTRIDGE	
EL2	RA	CASE	
BH	RH	USED ON	
NEXT ACSY		APPLICATION	





Advanced Development and Engineering Center

No. 30012

101 Chester Road • Swarthmore, Pennsylvania 19081

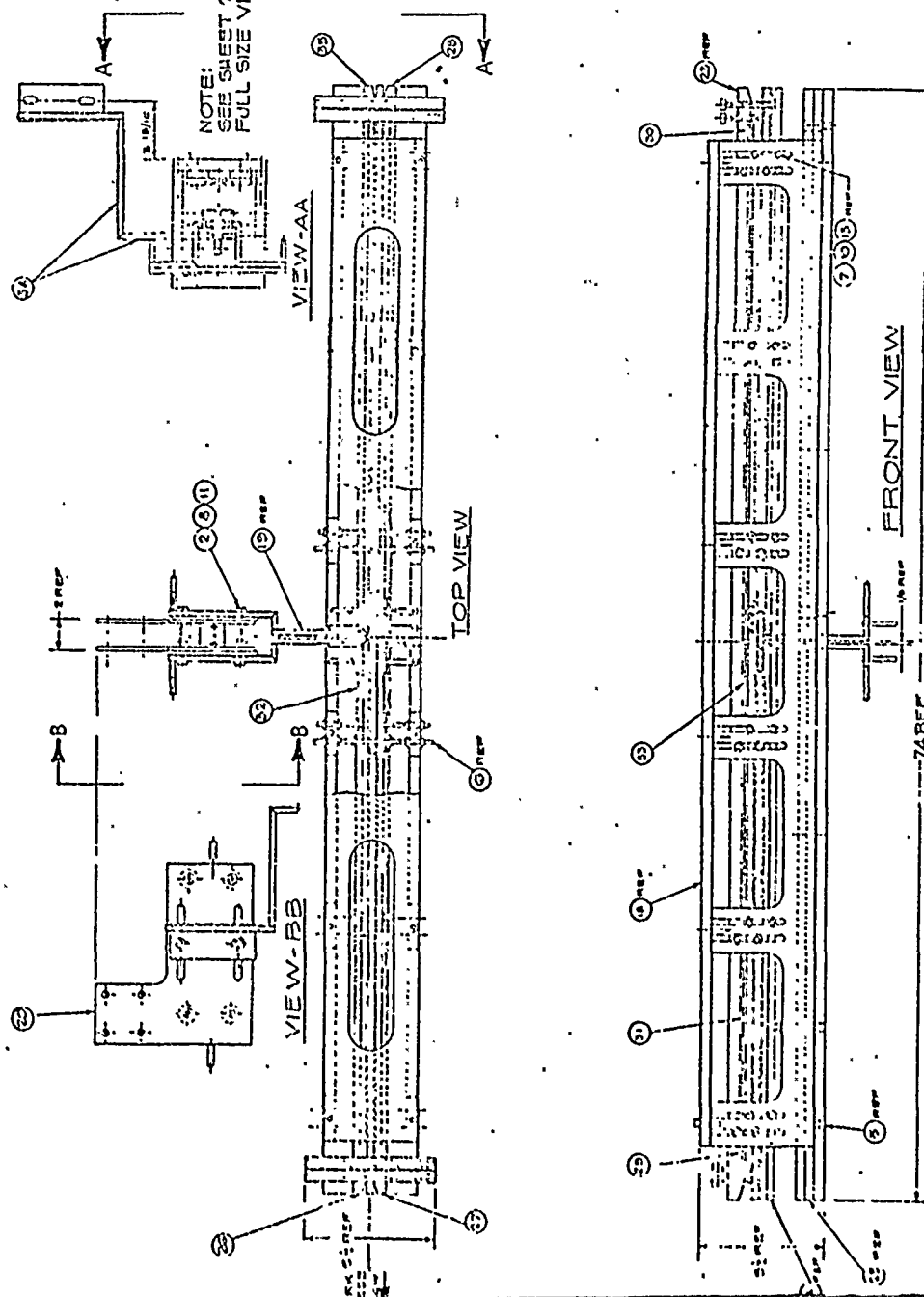
ATTACHMENT 2 COIL DRAWINGS



Interdraw Anneal Coil Assembly	11831410
Side Support	11831411
Bottom Support	11831412
Top Plate	11831413
Coil Winding Assembly	11831414
Output Buss Assembly	11831415
Chain Guide	11831416
Top Guide	11831417
Pin Guide Assembly	11831418
Spacer	11831419
Case Guide, Entrance	11831420
Case Guide, Exit	11831421
Ferrite Core, Solid	11831422
Ferrite Core, Cut Out	11831423
Ferrite Core, Cut Out - Front	11831424
Spacer Strip	11831425
Stress Relief	11831426
Base Plate	11831427
End Support Assembly	11831428
Bracket Assembly	11831429
Spacer - Buss Bar	11831430
Buss Bar - Intercoil	11831431
Buss Bar - Intercoil	11831432
Buss Bar - Connector	11831433
Buss Bar - Terminal	11831434
Neck & Mouth Anneal - Coil Assembly	11831435
Spacer, Coil	11831436
Coil Connector	11831437
Case Guide	11831438
Support Assembly, Case Guide	11831439
Clip Guide Assembly	11831440
Case Pressure Bar Assembly	11831441
Side Support Assembly	11831442



Top Plate	11831443
Chain Guide Assembly	11831444
Body Anneal Coil Assembly	11831445
Base Plate	11831446
Coil Segment	11831447
Coil Connector	11831448
Case Guide Assembly	11831449
Support Assembly, Case Guide	11831450
Side Support Assembly	11831451
Side Support Assembly	11831452
Top Plate	11831453
Chain Guide Assembly	11831454
Laminated Magnetic Flux Concentrator	11831456
Coil Segment	11831458
Coil Segment	11831459
Coil Segment	11831460
Coil Segment	11831461
Coil Segment	11831462
Coil Segment	11831463
Coil Segment	11831464
Coil Segment	11831465
Coil Segment	11831466
Coil Segment	11831467
Coil Segment	11831468
Coil Segment	11831469
Coil Segment	11831470



CONTINUED ON SHEET 2					PARTS LIST	
ITEM NO.	QTY REQD	CODE	DESCRIPTION	PART NO.	MATERIAL	
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SEE SEPERATE PART LIST 11831410

[illegible]

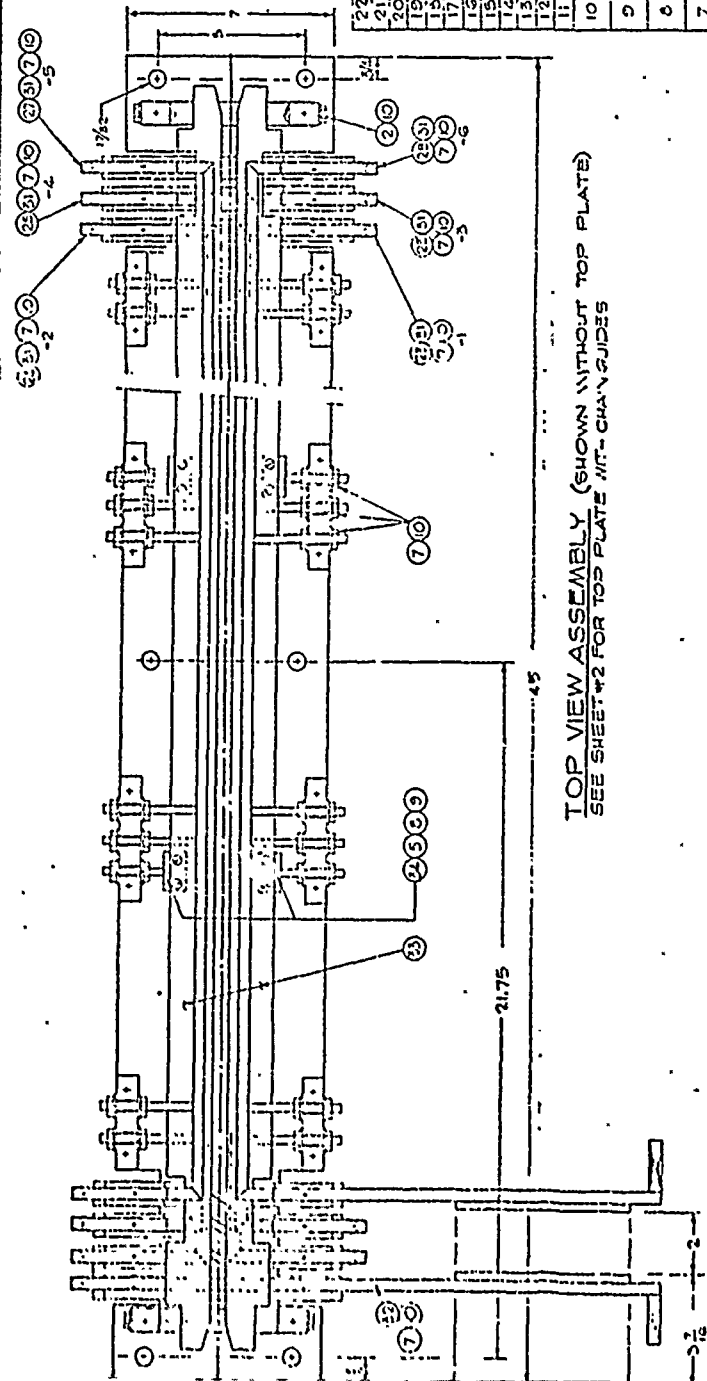


ITEM NO.	QTY	COSE BENT NO.	PART NO.	DESCRIPTION	SPECIES	MATERIAL
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36	1		113314213	SEALER STAMP		
37	2		113314214	PER. COGNITIVE FRONT		
38	1		113314215	PER. COGNITIVE FRONT		
39	1		113314216	PER. COGNITIVE OF CH. EAR		
40	1		113314217	PER. COGNITIVE OF CH. EAR		
41	0		113314218	PER. COGNITIVE OF CH. EAR		
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43	2		113314220	PER. COGNITIVE OF CH. EAR		
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46	1		113314223	PER. COGNITIVE OF CH. EAR		
47	1		113314224	PER. COGNITIVE OF CH. EAR		
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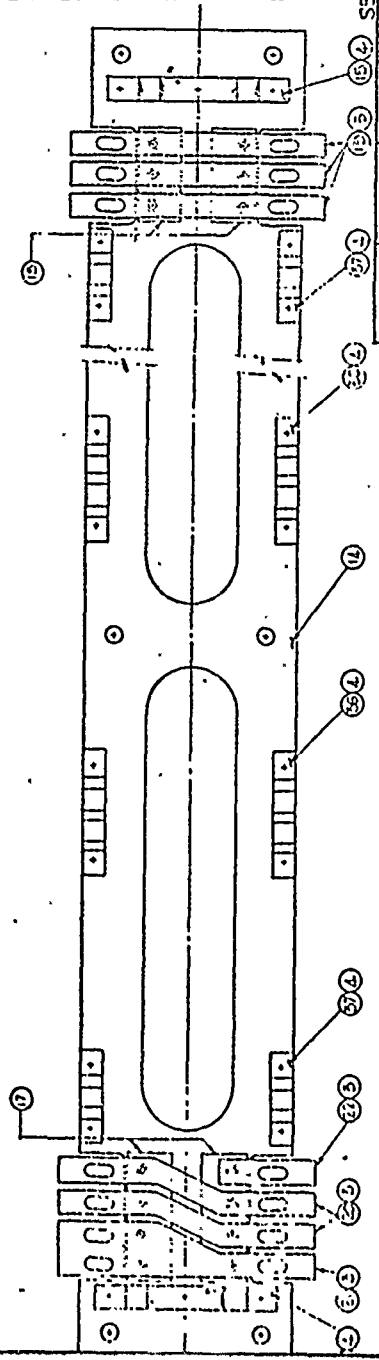
PARTS LIST

===== SEPARATE PART LIST 1131410 =====

[illegible]



TOP VIEW ASSEMBLY (SHOWN WITHOUT TOP PLATE)  
SEE SHEET #2 FOR TOP PLATE MOUNTING GUIDES



BASE PLATE ASSEMBLY  
LESS COIL SEGMENTS & GUIDES ETC

CONTINUED ON SHEET 2

ITEM NO.	DESCRIPTION	PART NO.	QTY
10	WASHER FLAT 1/2	1031440-10	10
11	WASHER FLAT 1/2	1031440-11	10
12	WASHER FLAT 1/2	1031440-12	10
13	WASHER FLAT 1/2	1031440-13	10
14	WASHER FLAT 1/2	1031440-14	10
15	WASHER FLAT 1/2	1031440-15	10
16	WASHER FLAT 1/2	1031440-16	10
17	WASHER FLAT 1/2	1031440-17	10
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67	WASHER FLAT 1/2	1031440-67	10
68	WASHER FLAT 1/2	1031440-68	10
69	WASHER FLAT 1/2	1031440-69	10
70	WASHER FLAT 1/2	1031440-70	10
71	WASHER FLAT 1/2	1031440-71	10
72	WASHER FLAT 1/2	1031440-72	10
73	WASHER FLAT 1/2	1031440-73	10
74	WASHER FLAT 1/2	1031440-74	10
75	WASHER FLAT 1/2	1031440-75	10
76	WASHER FLAT 1/2	1031440-76	10
77	WASHER FLAT 1/2	1031440-77	10
78	WASHER FLAT 1/2	1031440-78	10
79	WASHER FLAT 1/2	1031440-79	10
80	WASHER FLAT 1/2	1031440-80	10
81	WASHER FLAT 1/2	1031440-81	10
82	WASHER FLAT 1/2	1031440-82	10
83	WASHER FLAT 1/2	1031440-83	10
84	WASHER FLAT 1/2	1031440-84	10
85	WASHER FLAT 1/2	1031440-85	10
86	WASHER FLAT 1/2	1031440-86	10
87	WASHER FLAT 1/2	1031440-87	10
88	WASHER FLAT 1/2	1031440-88	10
89	WASHER FLAT 1/2	1031440-89	10
90	WASHER FLAT 1/2	1031440-90	10
91	WASHER FLAT 1/2	1031440-91	10
92	WASHER FLAT 1/2	1031440-92	10
93	WASHER FLAT 1/2	1031440-93	10
94	WASHER FLAT 1/2	1031440-94	10
95	WASHER FLAT 1/2	1031440-95	10
96	WASHER FLAT 1/2	1031440-96	10
97	WASHER FLAT 1/2	1031440-97	10
98	WASHER FLAT 1/2	1031440-98	10
99	WASHER FLAT 1/2	1031440-99	10
100	WASHER FLAT 1/2	1031440-100	10

PARTS LIST

SEE SEPARATE PART LIST 1031445 PART NO. 1031445

ITEM NO.		CODE		DESCRIPTION	
1	1	1031440-1	1	1031440-1	1031440-1
2	2	1031440-2	2	1031440-2	1031440-2
3	3	1031440-3	3	1031440-3	1031440-3
4	4	1031440-4	4	1031440-4	1031440-4
5	5	1031440-5	5	1031440-5	1031440-5
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92	92	1031440-92	92	1031440-92	1031440-92
93					

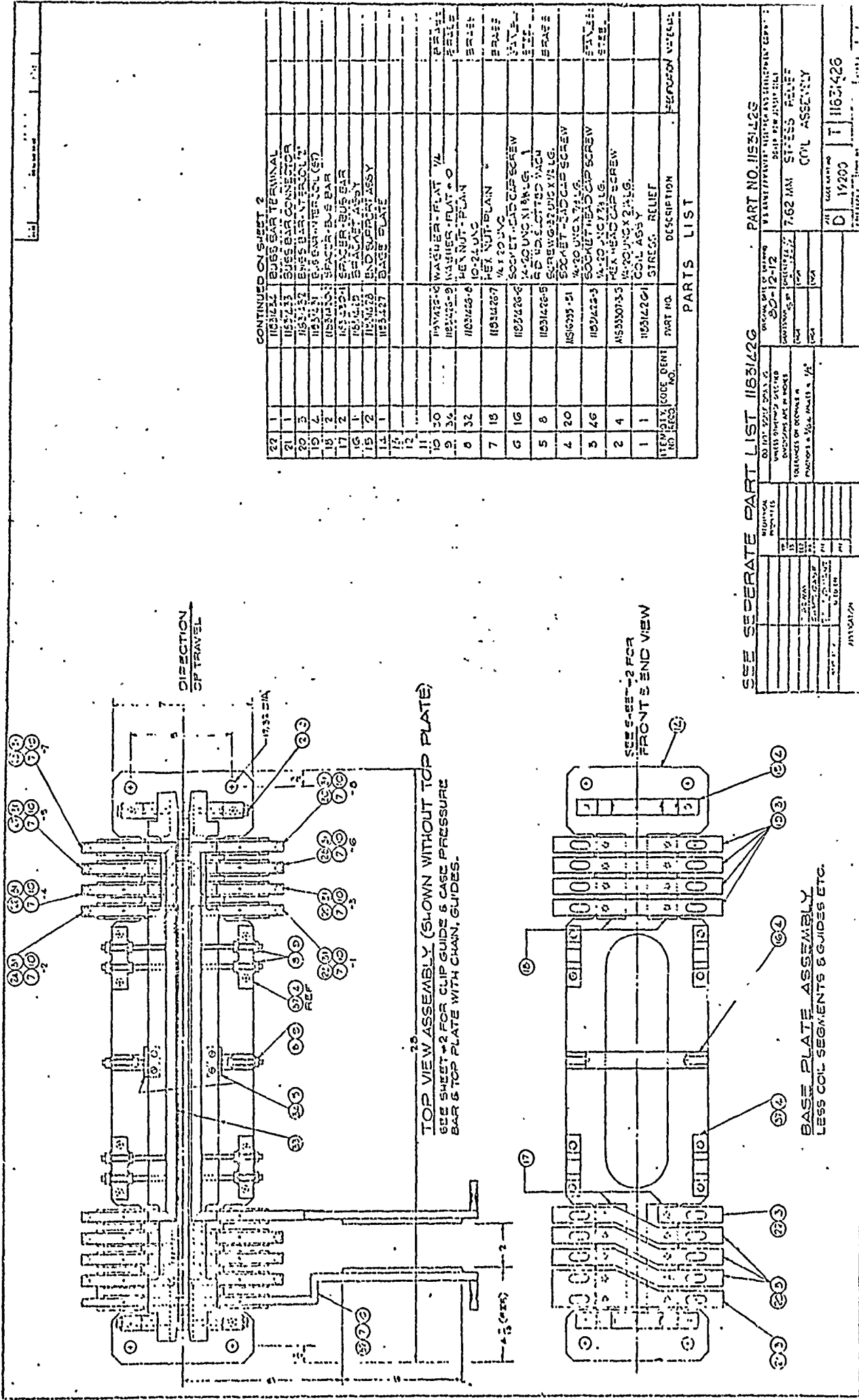


## PARTS LIST

SEE SEPARATE PART LIST 11831425

PART NO. 1531425

SEE SEPARATE PART		HIGH QUALITY		DO NOT SCALE		LAST NAME, FIRST NAME		WEIGHT DATE OF BIRTH		PAST AND PRESENT EMPLOYERS	
PART (1)		PART (2)		PART (3)		PART (4)		PART (5)		PART (6)	
1	100	100	100	100	100	100	100	100	100	100	100
2	100	100	100	100	100	100	100	100	100	100	100
3	100	100	100	100	100	100	100	100	100	100	100
4	100	100	100	100	100	100	100	100	100	100	100
5	100	100	100	100	100	100	100	100	100	100	100
6	100	100	100	100	100	100	100	100	100	100	100
7	100	100	100	100	100	100	100	100	100	100	100
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11	100	100	100	100	100	100	100	100	100	100	100
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14	100	100	100	100	100	100	100	100	100	100	100
15	100	100	100	100	100	100	100	100	100	100	100
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30	100	100	100	100	100	100	100	100	100	100	100
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33	100	100	100	100	100	100	100	100	100	100	100
34	100	100	100	100	100	100	100	100	100	100	100
35	100	100	100	100	100	100	100	100	100	100	100



CONTINUED ON SHEET 2

ITEM NO.	QTY	CODE	DESCRIPTION	PART NO.	REVISION
1	1		WASHER - FLAT 1/4	11	
2	1		NUT - PLAIN 1/4	12	
3	1		WASHER - FLAT 1/4	13	
4	1		NUT - PLAIN 1/4	14	
5	1		WASHER - FLAT 1/4	15	
6	1		NUT - PLAIN 1/4	16	
7	1		WASHER - FLAT 1/4	17	
8	1		NUT - PLAIN 1/4	18	
9	1		WASHER - FLAT 1/4	19	
10	1		NUT - PLAIN 1/4	20	
11	1		WASHER - FLAT 1/4	21	
12	1		NUT - PLAIN 1/4	22	
13	1		WASHER - FLAT 1/4	23	
14	1		NUT - PLAIN 1/4	24	
15	1		WASHER - FLAT 1/4	25	
16	1		NUT - PLAIN 1/4	26	
17	1		WASHER - FLAT 1/4	27	
18	1		NUT - PLAIN 1/4	28	
19	1		WASHER - FLAT 1/4	29	
20	1		NUT - PLAIN 1/4	30	
21	1		WASHER - FLAT 1/4	31	
22	1		NUT - PLAIN 1/4	32	
23	1		WASHER - FLAT 1/4	33	
24	1		NUT - PLAIN 1/4	34	
25	1		WASHER - FLAT 1/4	35	
26	1		NUT - PLAIN 1/4	36	
27	1		WASHER - FLAT 1/4	37	
28	1		NUT - PLAIN 1/4	38	
29	1		WASHER - FLAT 1/4	39	
30	1		NUT - PLAIN 1/4	40	
31	1		WASHER - FLAT 1/4	41	
32	1		NUT - PLAIN 1/4	42	
33	1		WASHER - FLAT 1/4	43	
34	1		NUT - PLAIN 1/4	44	
35	1		WASHER - FLAT 1/4	45	
36	1		NUT - PLAIN 1/4	46	
37	1		WASHER - FLAT 1/4	47	
38	1		NUT - PLAIN 1/4	48	
39	1		WASHER - FLAT 1/4	49	
40	1		NUT - PLAIN 1/4	50	
41	1		WASHER - FLAT 1/4	51	
42	1		NUT - PLAIN 1/4	52	
43	1		WASHER - FLAT 1/4	53	
44	1		NUT - PLAIN 1/4	54	
45	1		WASHER - FLAT 1/4	55	
46	1		NUT - PLAIN 1/4	56	
47	1		WASHER - FLAT 1/4	57	
48	1		NUT - PLAIN 1/4	58	
49	1		WASHER - FLAT 1/4	59	
50	1		NUT - PLAIN 1/4	60	
51	1		WASHER - FLAT 1/4	61	
52	1		NUT - PLAIN 1/4	62	
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54	1		NUT - PLAIN 1/4	64	
55	1		WASHER - FLAT 1/4	65	
56	1		NUT - PLAIN 1/4	66	
57	1		WASHER - FLAT 1/4	67	
58	1		NUT - PLAIN 1/4	68	
59	1		WASHER - FLAT 1/4	69	
60	1		NUT - PLAIN 1/4	70	
61	1		WASHER - FLAT 1/4	71	
62	1		NUT - PLAIN 1/4	72	
63	1		WASHER - FLAT 1/4	73	
64	1		NUT - PLAIN 1/4	74	
65	1		WASHER - FLAT 1/4	75	
66	1		NUT - PLAIN 1/4	76	
67	1		WASHER - FLAT 1/4	77	
68	1		NUT - PLAIN 1/4	78	
69	1		WASHER - FLAT 1/4	79	
70	1		NUT - PLAIN 1/4	80	
71	1		WASHER - FLAT 1/4	81	
72	1		NUT - PLAIN 1/4	82	
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74	1		NUT - PLAIN 1/4	84	
75	1		WASHER - FLAT 1/4	85	
76	1		NUT - PLAIN 1/4	86	
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82	1		NUT - PLAIN 1/4	92	
83	1		WASHER - FLAT 1/4	93	
84	1		NUT - PLAIN 1/4	94	
85	1		WASHER - FLAT 1/4	95	
86	1		NUT - PLAIN 1/4	96	
87	1		WASHER - FLAT 1/4	97	
88	1		NUT - PLAIN 1/4	98	
89	1		WASHER - FLAT 1/4	99	
90	1		NUT - PLAIN 1/4	100	

PARTS LIST

SEE SEPERATE PART LIST 11631426

PART NO. 11631426

QUANTITY 1

DESCRIPTION 11631426

UNIT 1

DATE 11/12/12

7.62 MM

ST-255

POWER

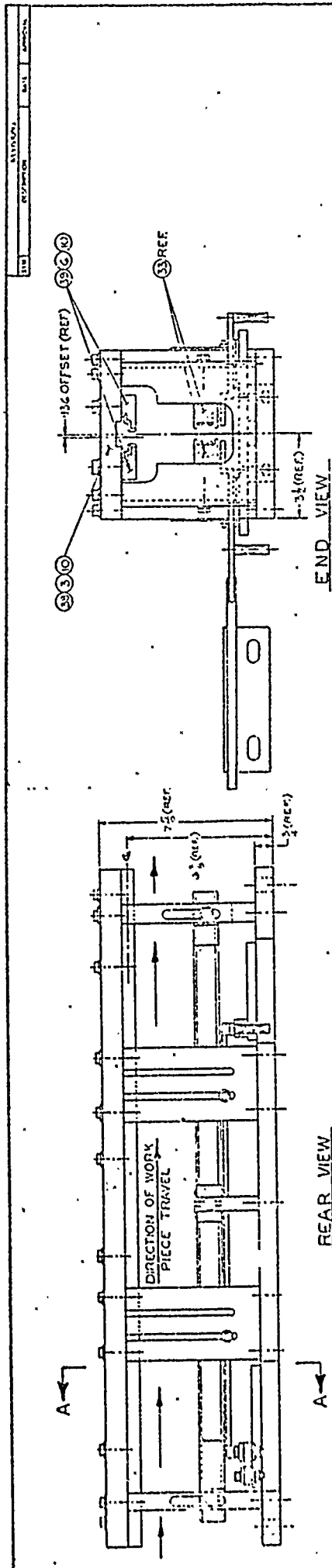
COIL ASSEMBLY

11631426



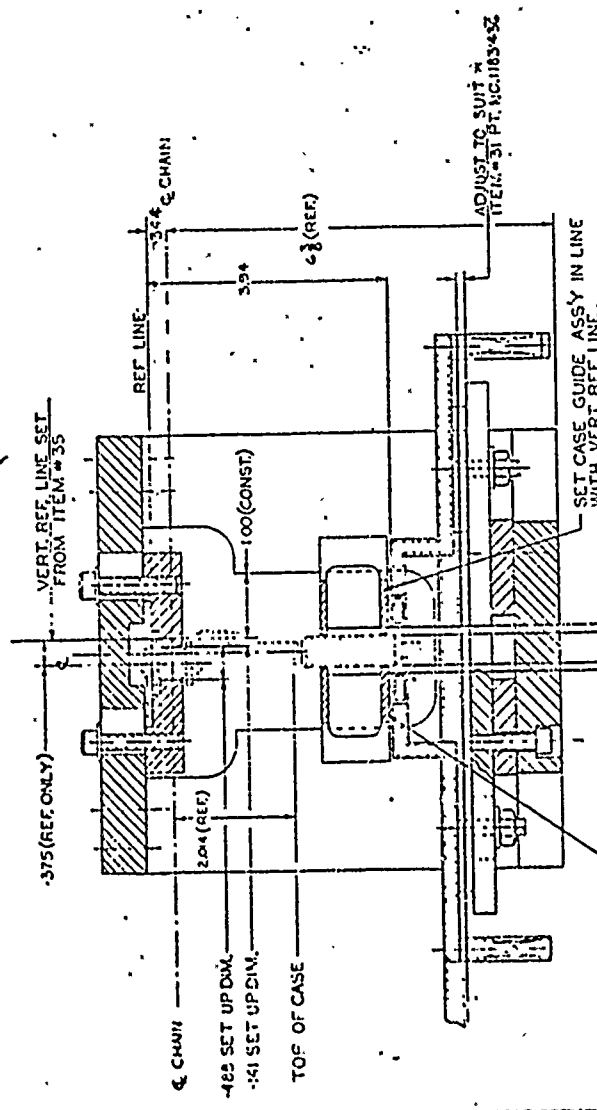
INDICATE





REAR VIEW

END VIEW



CASE GUIDE ASSY

FULL SIZE SECTION-AA

ITEM NO.	QTY	CODE	DESCRIPTION	REMARKS
35	2		11831441 GUIDE ASSY	
36	1		11831443 TOP PLATE	
37	4		11831442 SIDE SUPPORT ASSY	
38	2		11831440 SUPPORT ASSY GUIDE	
39	7		11831438 CASE GUIDE ASSY	
40	1		11831437 COIL CONNECTOR	
41	16		11831435 SENSER-COIL	
42	20			
43	27			
44	26			
45	25			
46	1		11831453 COIL SENSER	
47	1		11831453 COIL SENSER	
48	1		11831453 COIL SENSER	

PARTS LIST

SEE SEPARATE PART LIST

PART NO.		7.02MM CARTRIDGE CASE LINE	
7.02MM CARTRIDGE CASE LINE		NECK AND MOUTH ANNEAL	
COIL ASSEMBLY		COIL ASSEMBLY	
DATE		11/21/55	
BY		D. J. 1955	



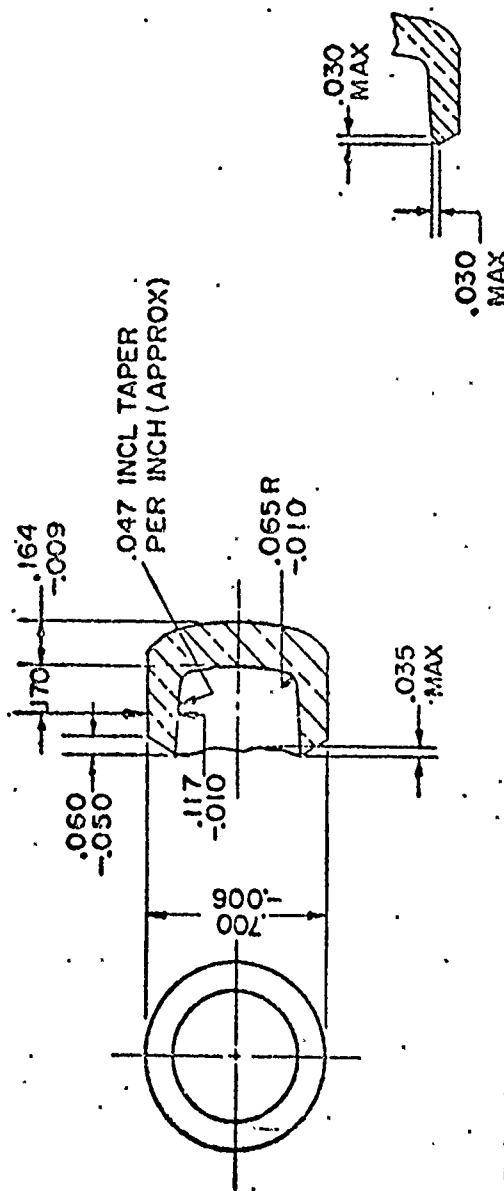
Advanced Development and Engineering Center

No. 30012

101 Chester Road • Swarthmore, Pennsylvania 19081

ATTACHMENT 3 IN-PROCESS PART DEFINITIONS

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	EO # S 60161	2-8-67	MA
B	(1) SEE EO # S 90016	3-25-69	MA



**NOTES:-**

- 1- WALL THICKNESS VARIATION AROUND THE PERIPHERY AT ANY SPECIFIED POINT ALONG THE CYLINDRICAL LENGTH OF THE CUP SHALL NOT VARY MORE THAN .005
- 2- CUP SPEC MIL-C-10375(MU) B
- 3- COPPER ALLOY NO.260, ANNEALED, SPEC MIL-C-50

PART NO. 10522459  
CODE IDENT NO. 19200

DIO521997		7.65X NATO		SEE ENGINEERING RECORDS		NEXT ASSY		USED ON		APPLICATION		TOL NOS		APPL PART NOS			
PHYSICAL PROPERTIES		UNLESS OTHERWISE SPECIFIED		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU	
TEMP		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
TS		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
CL 2		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
RA		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
DH		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
PH		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
FINAL PROTECTIVE FINISH		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
MATERIAL		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
NOTE 3		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
HEAT TREATMENT		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
SUBMITTED		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
Morton		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
ORD COMP		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
APPROVED BY ORDER OF THE		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
CHIEF OF MANUFACTURE		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
SCALE: 2 / 1		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
UNIT WT. 224 - 14 GRS		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
CUP (3 DRAW)		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
ESD		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
ADEL		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
US ARMY		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
FRANKFORD ARSENAL		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
10522459		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
B		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	
UNIT WT. 224 - 14 GRS		DIMENSIONS ARE IN INCHES		TOLERANCES ON FRACTIONS		ANGLES		ORIGINAL DATE OF DRAWING		APRIL 13, 1962		DRAWING SIZE		EQU		EQU	



<u>DRAW</u>	Outside Diameter	Wall Thickness (Distance from Inside Base)	Base Thickness	Overall Length
First Draw	.539/.542	.030/.032 (.875)	.170/.174	1.19
Second Draw	.525/.527	.021/.023 (.875)	.170/.174	1.55
Third Draw	.468/.469	.032/.036 (.280) .011/.014 (1.700)	.176/.180	2.075

PRE-POCKET

Web Thickness  
.036/.040

HEADING

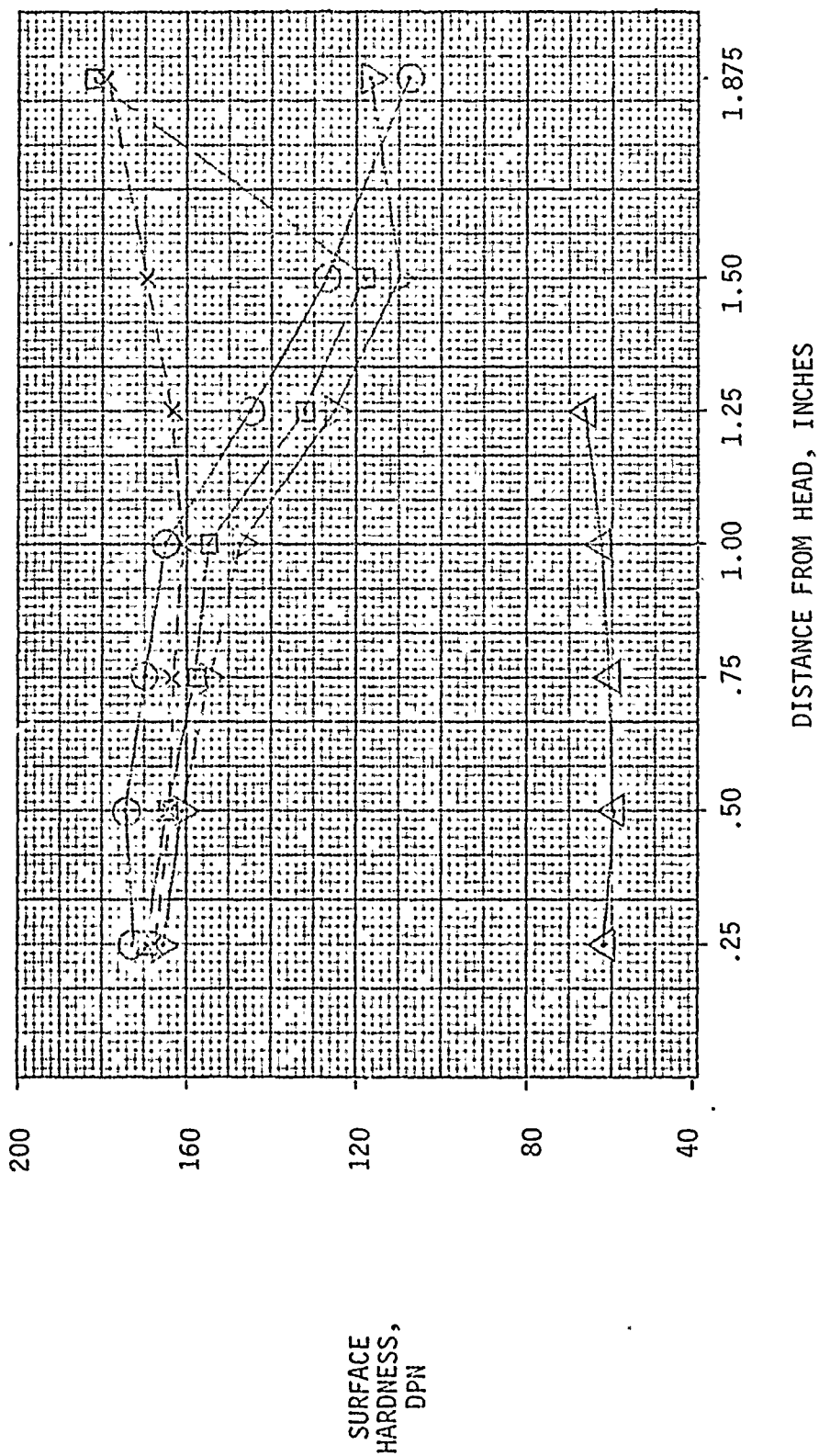
Web Thickness  
.072/.078

Flat Diameter  
.46 minimum

FIRST TAPER

Head-to-Shoulder Length  
1.573/1.577

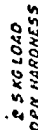
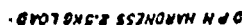
IN-PROCESS PART DEFINITIONS



Key

- △ - After second draw and interdraw anneal
- x - After final draw and head turn
- ▽ - After body anneal
- - After taper
- - Finished case

TYPICAL IN-PROCESS HARDNESS PROFILES



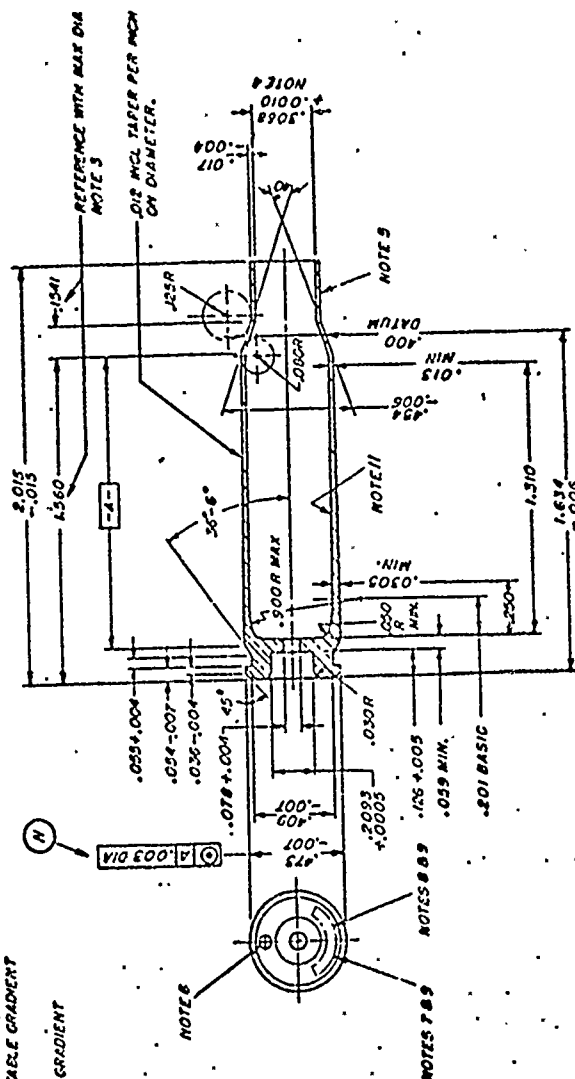
HEAD AXIAL SECTION:

NOTE 2

## MAX HAPPINESS GRADIENT

**OFFICIAL ACCEPTANCE GRANTED**

LOW PRESSURE GRADIENT.



THE AVERAGE HARNNESS READINGS OF 10 FINISHED CARTRIDGE CASES AT EACH POSITION INDICATED SHALL FALL WITHIN THE RANGE FOR THAT POSITION DEFINED BY THE MAXIMUM AND MINIMUM HARNNESS GRADIENTS. THE GREATEST PROBABILITY OF UNSATISFACTORY FUNCTION OF CARTRIDGES ASSEMBLED WITH THESE CASES OCCURS WHEN THE GRAPH OF THESE AVERAGE READINGS IS GENERALLY PARALLEL TO THE LIMIT GRADIENTS AND IS FREE FROM SHARP ANGULAR DEPARTURES THEREFROM IN THE AREA OF THE HEAD.

MINIMUM HARDNESS AT POINT A TO BE 165 D.P.N. MINIMUM HARDNESS AT POINTS B, C AND D TO BE 180 D.P.N. HARDNESS IN THE REGION 0.5 FROM THE NEED TO 1.815 FROM THE NEED.

**DIMENSIONS GIVEN AT INTERSECTION OF LINES.**

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

**DIMENSIONS AT PLUGGING OPERATION FOLLOWING WATER PLUGGING OPERATIONS.**

**WATO IDENTIFICATION MARK:**

TRADE MARK. RECOGNIZED TRADE MARK.

STANDARD LAST TWO FIGURES OF YEAR OF MANUFACTURE.

DO NOT EXCEED THE NOT ENGAGE ON THE PRINTER CRIMP OR HEAD BEVEL.

FOR THE PURPOSES OF THE AIRCRAFT AND TO ENFORCE THE AIRCRAFT ACTS

STANDARD FOR DIMENSIONING AND TOLERANCING

THE CONSTRUCTION DIMENSIONS WHICH INSURE THE MINIMUM PERMISSIBLE WALL THICKNESS.

WATSEMAN, COPPER ALLOY NO 250 ANNEAL CO. SPEC NWL-C-50

21P1108:Y1 04: 10527459. 10V15C:Y

| LINE | DESCRIPTION                    | DATE   | AMOUNT |
|------|--------------------------------|--------|--------|
| 1    | REPLACES REV N WITHOUT CHARGES | 9-1-78 |        |
| 2    | SEE E O # S80004               |        |        |
| 3    |                                |        |        |
| 4    | 111 SEE E O # 527125           | 9-1-78 |        |
| 5    | N 11-21 SEE E O # 510132       | 9-1-78 |        |

PART No 10521997

100-1577  
 100-1577  
 100-1577

RECEIVED  
JAN. 29, 1962

before to the Southern  
States. These birds will  
be the first to be seen.

|  |  |
|--|--|
|  |  |
|--|--|

WILLIAM H. HARRIS

•

■

**AND. Q. IS MIN.**

WIN 5050-KJ3  
x  
21.11.2005 09:00:11

IS THERE A

MINNESOTA

RCF EX-100





Advanced Development and Engineering Center

101 Chester Road • Swarthmore, Pennsylvania 19081

No. 30012

ATTACHMENT 4 DIMENSIONAL INSPECTION DATA



| PARAMETER             | DWG. 10521997<br>TOLERANCE | 1            | 2            | 3            | 4            | 5            | 6            | AVERAGE      |
|-----------------------|----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Web Thickness         | .059 min.                  | .076         | .076         | .078         | .077         | .077         | .074         | .076         |
| Pocket Depth          | .126 + .005                | .130         | .130         | .130         | .130         | .130         | .130         | .130         |
| Pocket Diameter       | .2093 + .005               | .2093        | .2093        | .2093        | .2093        | .2093        | .2093        | .2093        |
| Groove Diameter       | .409 - .007                | .405         | .407         | .406         | .406         | .406         | .406         | .406         |
| Head Diameter         | .473 - .007                | .468         | .468         | .469         | .468         | .469         | .468         | .468         |
| Head Thickness        | .054 - .007                | .051         | .051         | .050         | .052         | .051         | .051         | .051         |
| Wall Thickness (.250) | .0305 min.                 | .034<br>.036 | .033<br>.036 | .034<br>.037 | .034<br>.036 | .034<br>.037 | .033<br>.037 | .034<br>.036 |
| Mouth Wall Thickness  | .017 - .004                | .015<br>.017 | .016<br>.016 | .014<br>.016 | .015<br>.016 | .015<br>.016 | .015<br>.016 | .015<br>.016 |
| Mouth Diameter        | .3067 + .001               | .3070        | .3075        | .3075        | .3070        | .3070        | .3075        | .3073        |
| Length to Shoulder    | 1.634 - .006               | 1.631        | 1.632        | 1.632        | 1.632        | 1.631        | 1.631        | 1.6315       |
| Overall Length        | 2.015 - .015               | 2.007        | 2.006        | 2.007        | 2.008        | 2.006        | 2.008        | 2.007        |
| Min./Max. Profile     |                            |              |              |              |              |              |              |              |

OK

DIMENSIONAL INSPECTION DATA



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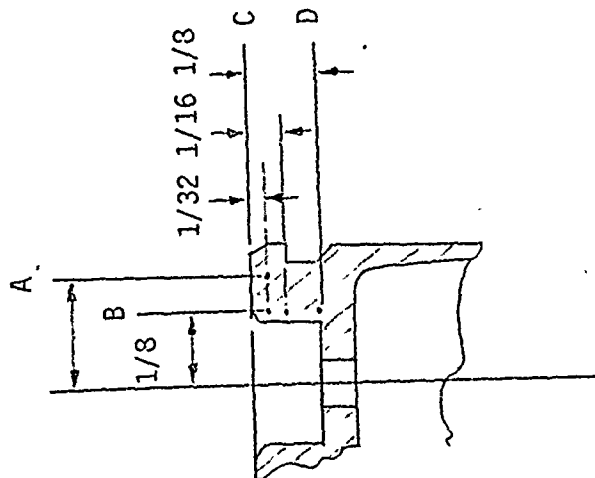
ATTACHMENT 5 METALLURGICAL INSPECTION DATA



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No. 30012



| POINT | AVERAGE DPN |
|-------|-------------|
| A     | 169.0       |
| B     | 198.0       |
| C     | 199.0       |
| D     | 198.6       |

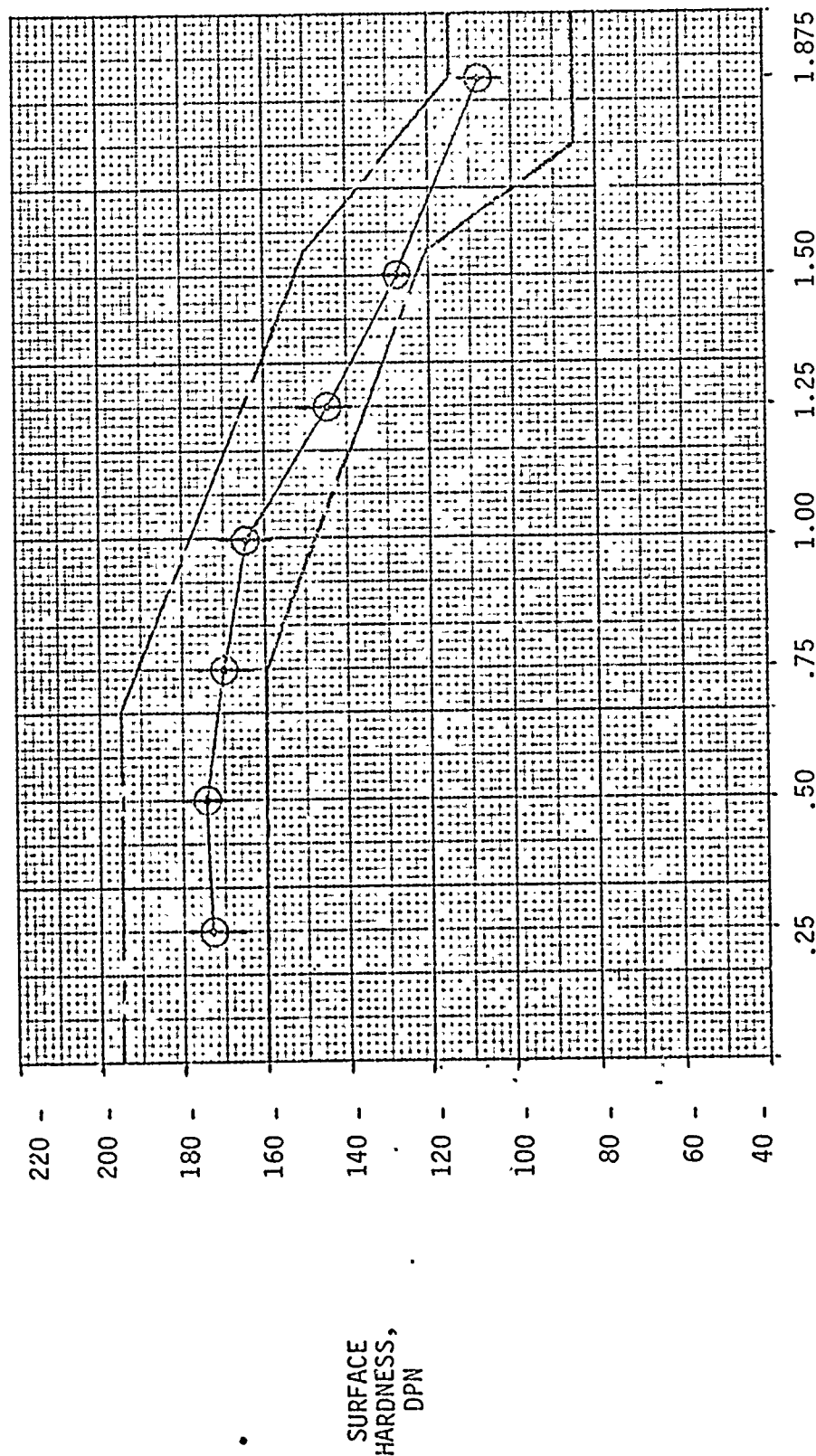
INTERNAL HEAD HARDNESS



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No. 30012



Key

Range of readings  
Average  
Specified limits

DISTANCE FROM HEAD, INCHES

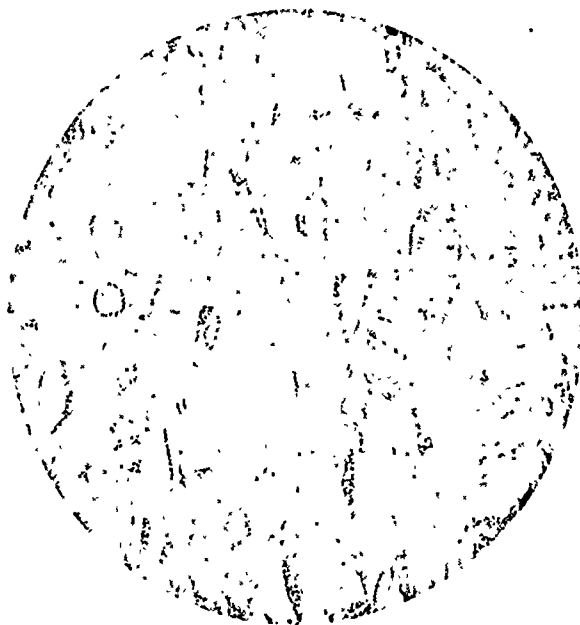
FINAL CASE HARDNESS GRADIENT



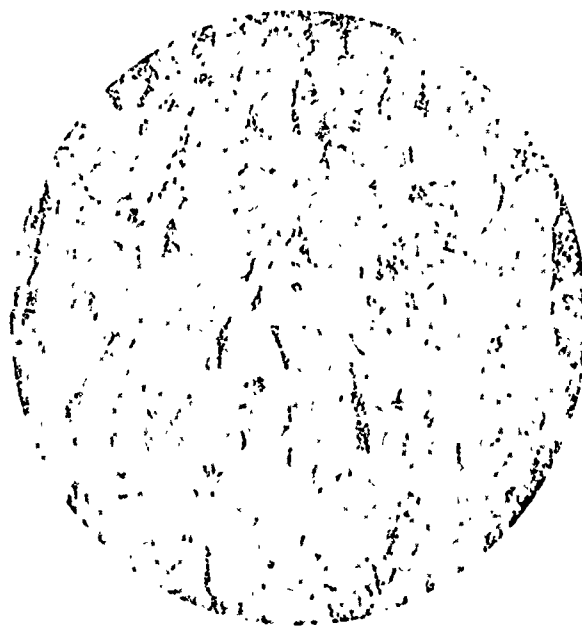
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.500 from head



.250 from head

magnification 75x

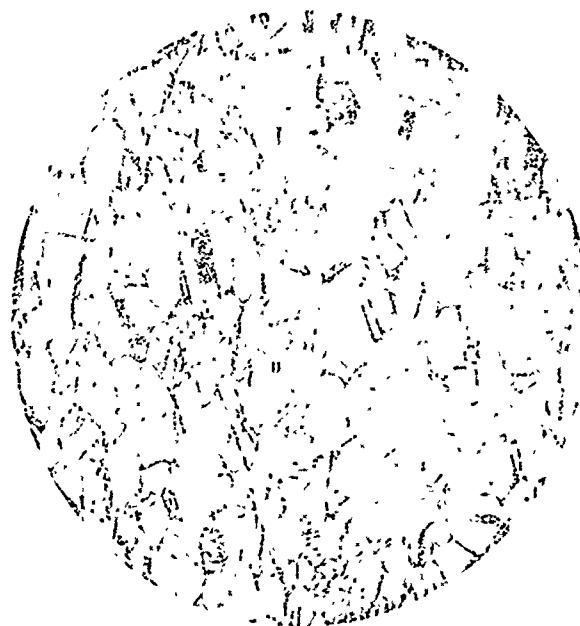
GRAIN STRUCTURE MICROPHOTOGRAPHS



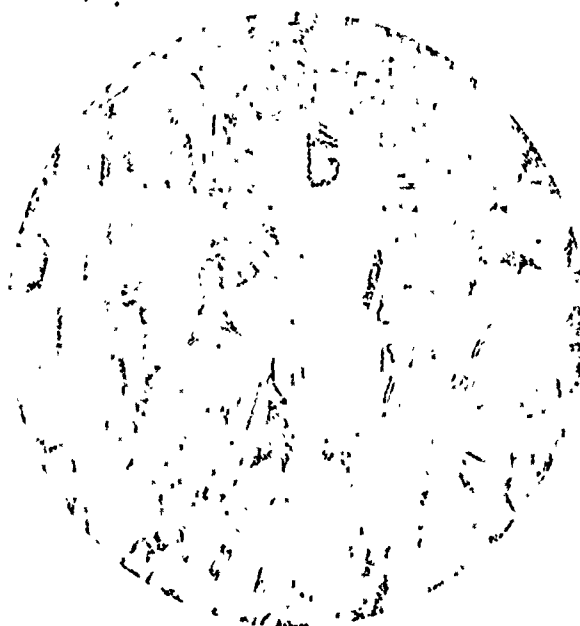
Advanced Development and Engineering Center

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No. 30012



1.000 from head



.750 from head

Magnification 75x

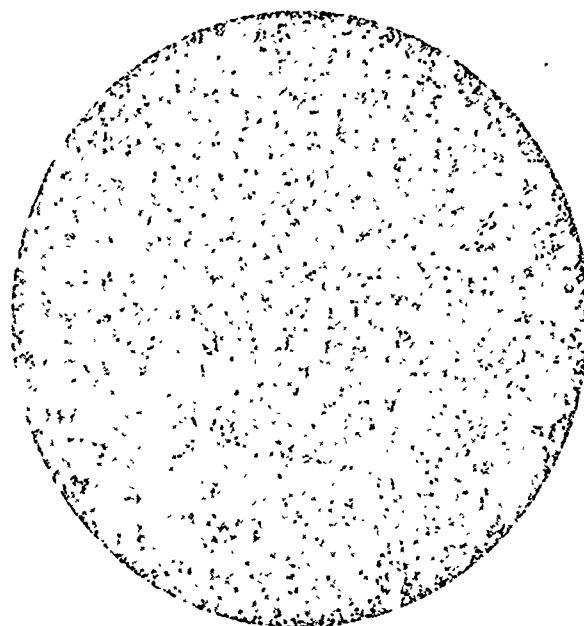
GRAIN STRUCTURE MICROPHOTOGRAPHS



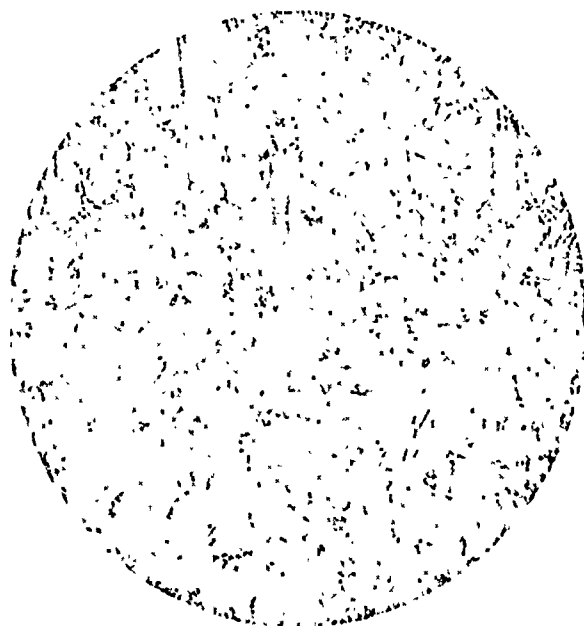
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101 Chester Road • Swarthmore, Pennsylvania 19081

No. 30012



1.500 from head



1.250 from head

Magnification - 75x

GRAIN STRUCTURE MICROPHOTOGRAPHS





Advanced Development and Engineering Center

101 Chester Road • Swarthmore, Pennsylvania 19081

No. 30012

ATTACHMENT 6 TEST FIRING DATA

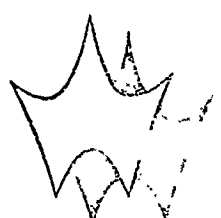
# H. P. WHITE LABORATORY, INC.

3114 Scarboro Road • Street, Maryland 21154 (301) 838-6550

RECEIVED

NOV 3 1980

K. H.



30 October 1980  
(HPWLI 2483)

Gulf and Western Industries, Inc.  
101 Chester Road  
Swarthmore, Pennsylvania 19081

Attention: Mr. K. Hall

Gentlemen:

In accordance with your Purchase Order No. 78625-02, H.P. White Laboratory, Inc. conducted firing tests of twenty (20) experimental 7.62mm brass cartridge cases.

A propellant loading was developed which would produce the pressures specified for the caliber 7.62mm, M80 High Pressure Test (proof) cartridge. The cases were primed and loaded in accordance with that loading and the cartridges fired in a pressure barrel configured to determine peak chamber pressures in copper units of pressure (CUP). Table I is a summary of the attached data record of these firings.

TABLE I. SUMMARY OF RESULTS

| Propellant Load (1)<br>(grains)                               | Number Fired | Pressure (CUP x 1000) |         |             |
|---|--------------|-----------------------|---------|-------------|
|   |              | Maximum               | Minimum | Average (2) |
| 41.0 to 44.0 (3)  | 7            | 62.2                  | 56.5    | 59.7        |
| 41.5 to 42.0 (4)  | 2            | 62.2                  | 61.3    | 61.8        |
| 42.5 (4)  | 11           | 69.0                  | 64.4    | 66.3        |
| (1) IMR 4475 propellant                                       |              |                       |         |             |
| (2) MIL-Spec average pressure for M80: 67,500 $\pm$ 2500 PSI. |              |                       |         |             |
| (3) 150 grain bullet.   |              |                       |         |             |
| (4) 180 grain bullet.   |              |                       |         |             |

Gulf and Western Industries, Inc.

Attention: Mr. K. Hall

30 October 1980

Page 2

Subsequent to these tests the spent cases were examined for evidence of cracks, bulging, distortion, primer leakage, etc. No deficiencies were noted.

The spent cases are being returned via United Parcel Service under separate cover. Should you have any questions regarding this matter or if we may be of any further service, please do not hesitate to contact us.

Very truly yours,

H.P. WHITE LABORATORY, INC.



D.R. Dunn

DRD/lt  
enclosures

JOB NO. 2483

**Ammunition:** 7.62 handloads



Advanced Development and Engineering Center

No. 30012

101 Chesler Road • Swarthmore, Pennsylvania 19081

ATTACHMENT 7 VOID TEST DATA



| <u>Test</u> | <u>Power<br/>(KW)</u> | <u>1/2 in.</u> | <u>1-1/2 in.</u> | <u>Conditions</u>   |
|-------------|-----------------------|----------------|------------------|---------------------|
| A           | 104                   | 173.3          | 131.5            | All 24 stations     |
| B           | 102                   | 170.5          | 128.6            | 4 even voids        |
| C           | 102                   | 144.7          | 127.9            | 4 consecutive voids |
| D           | 101                   | 170.7          | 130.2            | 6 even voids        |
| E           | 101                   | 130.8          | 123.7            | 6 consecutive voids |

VOID TEST DATA